2015 Piping Plover and Least Tern Project Report for Maine

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INTRODUCTION

Maine Audubon began monitoring Least Terns in 1977 and Piping Plovers in 1981. Each year an annual report has been produced and is available for review of historical data. The conservation of these species continues to be a cooperative effort with landowners and other organizations and agencies. Maine Audubon, Maine Department of Inland Fisheries and Wildlife (MDIFW), U.S. Fish and Wildlife Service (USFWS), USDA AHIS Wildlife Services (Wildlife Services) and Rachel Carson National Wildlife Refuge (RCNWR) contribute to this project each year.

Maine Audubon and RCNWR both hire and supervise seasonal personnel, negotiate management agreements with private landowners, ensure consistent management practices, compile data collected from all cooperators, provide and supervise the primary field personnel for the project, and work collaboratively with municipalities on beach management issues. The staff at the RCNWR has primary responsibility for monitoring and management of six of the 28 beaches currently being monitored. They have been invaluable in covering additional sites whenever the Maine Audubon crew was unavailable. Maine Audubon has the primary responsibility for management of the majority of sites and for producing the annual statewide report. National Audubon has staff on Stratton Island managing Common Terns as well as Least Terns when they nest there. MDIFW is the primary coordinator for municipal management agreements, provides funding support and equipment (including trucks for the seasonal staff), provides overall oversight, and assists with management on several sites.

The population status of Piping Plovers in Maine remains precarious and the birds continue to need intensive management. Although productivity of Piping Plovers has increased dramatically since exclosures were first used in 1989, predation of chicks and adults, storm activity, development, and heavy beach use by people and pets has negatively impacted reproductive success and population recovery

Maine's Least Tern population appears to be generally increasing, though there is considerable variability year to year. Average Least Tern productivity during the last 25 years (from 1990-2015) was calculated at 0.69 fledglings per pair, but productivity estimates are conservative due to the field methods used. Changes in monitoring efforts in the past five years have likely affected this productivity measure over time as well. Changes in available nesting habitat and increased predation rates, particularly by "smart predators," have also affected distribution of Least Terns throughout the state.

METHODS AND MATERIALS

Population Monitoring

Plovers typically first appear in Maine in mid to late March. Observations of beaches began in mid to late April at all potential nesting sites. The 28 sites that are regularly monitored and managed include Ogunquit Beach in Ogunquit; Moody, Wells, Drakes Island and Laudholm Beaches in Wells; Crescent Surf and Parsons Beaches in Kennebunk; Batson River (Marshall Point) and Goose Rocks Beach in Kennebunkport; Fortunes Rocks Beach and Hills Beach in Biddeford; Goosefare Brook (Kinney Shores) and Ferry Beach in Saco; Ocean Park and Old Orchard Beach in Old Orchard Beach; Pine Point, Western/Ferry, Scarborough and Higgins Beaches in Scarborough; two beaches at Ram Island Farm and Crescent Beach State Park in Cape Elizabeth; Seawall, Popham, and Hunnewell Beaches in Phippsburg;

and Reid State Park Beaches in Georgetown. Other sites were occasionally monitored, including Basket Island in Biddeford, Richmond Island at Ram Island Farm in Cape Elizabeth, Head Beach in Phippsburg and Indian Point in Georgetown.

Beach Monitoring

Once territorial Piping Plovers or courting Least Terns were observed, sites were visited at least once a week by biologists from Maine Audubon and more frequently at sites monitored by the staff from RCNWR. Trained volunteers and interns assisted biologists regularly.

The presence of paired and unpaired Piping Plovers and Least Terns were recorded on data sheets (Appendix I) at each visit. Once plover nests were located, total numbers of eggs, chicks, and fledglings were recorded on separate nesting data sheets (Appendix II).

Piping Plover Monitoring

The state-wide plover census was on June 8th and 9th. Census results produced an estimated 59 pairs (Appendix III), and more pairs were identified after the census window on some beaches. Because plovers continued to nest after these dates, we also calculated the "best estimate" for total pairs in Maine at the end of the season by counting all nesting attempts and then factoring in failed and re-nesting attempts. By comparing dates of failed nests with dates of re-nesting attempts at all sites, a conservative estimate was calculated for the total number of nesting pairs. Our best estimate is 62 nesting pairs.

Least Tern Monitoring

We continue to work towards developing best practices for estimating total numbers of nesting and fledgling Least Terns. We believe all methods for counting are estimates and not "true" numbers; however, we have devised protocols to minimize noise and bias by using coordinated pair and fledgling counts. Coordinated pair counts in most years may be slightly off, and fledgling counts almost always underestimate fledgling success. Accurate estimates continue to be a challenge because of the transient nature of Least Tern colonies, the fact that fledgling birds are not individually identifiable, and that nesting and fledging at colonies within Maine often do not occur simultaneously because of disturbance. However, a certain percentage of adults will still be missed, and double-counting those individuals who fledge early in the season also is a risk. We used multiple methods to estimate the number of nesting adults within the state and the number of fledglings they produce, detailed below.

Window Pair Count

A Least Tern working session was held during the Atlantic Coast Piping Plover and Least Tern Workshop at the National Conservation and Training Center in Shepherdstown, West Virginia on January 18-20, 2006. A need for information on population trends within the adult population of Least Terns on the east coast was identified. In an effort to gather meaningful population data to improve population estimates for tracking the species, a Least Tern window count was established for the states from Maine to North Carolina that continues to this day.

In January of 2012 an analysis of the available data indicated that overall, Least Terns appear to be stable, however, population estimates can fluctuate widely (up to 25% year to year). A five year average for colonies from Virginia to Maine (excluding North Carolina and Maryland) was found to be 7,921

pairs with a standard deviation of +/- 15%. North Carolina does not conduct surveys annually, and roof-top nesting in MD makes full count data difficult to collect. For Maine, the window protocol provides a consistent methodology for estimating the number of nesting pairs within the state.

The protocol calls for counts to take place between June 5-20, within a 7-day time frame, after Least Terns have settled at a nesting site, but before any major colony disruptions have occurred. This requires some coordination with partners who manage Least Tern colonies at each site to time the surveys appropriately. All nests or birds in an incubating posture are counted, depending on if the count occurs within the colony or from the perimeter of the colony.

In 2015, coordinated state-wide counts took place June 10. Nests were counted using walk-through nest counts.

Estimating Productivity

Previously, dusk surveys had been conducted (from 2003-2008) as we believed that most terns return to the colony once the visibility for capturing fish is diminished as evening approaches. Continued work leads us to believe that tidal cycle is the most important consideration when conducting surveys, as the extensive sand flats exposed at low tide make counting the birds impossible. Current surveys are slated for about 2 hours before high tide or 1-2 hours after high tide and after most of the chicks are fledged. If necessary, another count spaced at least two weeks apart (mean fledgling residency time) is conducted and the numbers are added together for a total count. The number of later fledglings is compared with chick counts to ensure fledgling numbers considered "new" are consistent with what we have previously observed in the colony.

During the survey, counters stood outside the colony and were spaced such that each person counted up to the next volunteer. Counters used binoculars and recorded numbers of fledglings on data sheets. The areas tended to be rectangular and were "marked" using beach formations or debris and lines in the sand. Counters were stationed at all active colonies. Watches were synchronized and counts were conducted every five minutes. The highest estimate for a single time-slot across the colony was determined to be the best estimate of total fledglings present. Unfledged chicks were also recorded. When multiple waves of fledglings were produced, additional counts were taken every two to three weeks. At Stratton Island, where the entire Least Tern colony can be observed using a single observer, continuous daily counts were taken throughout the season.

Productivity estimates at all sites are more likely an underestimate versus an overestimate. Previous research in Maine indicates a mean fledgling residency time of two weeks, though fledgling residency time declines over the breeding season so not all fledglings may be counted.

Fencing

In general, stake-and-twine (symbolic) fencing was erected on beaches as soon as potential nesting sites of Least Terns and Piping Plovers were identified and as landowner permission was granted. The primary purpose of this fencing was to keep people and pets away from nesting birds. High priority sites were fenced first, based on habitat quality and history of successful plover and tern nesting. At sites where use by Piping Plovers was unpredictable it was difficult to determine placement of fencing ahead of time; these sites were fenced as soon as plovers exhibited territorial behavior or a nest was located.

The extent of symbolic fencing varied among sites depending on recent site occupation by Piping Plovers, the amount of habitat historically needed by plovers at each site, and on the desires of individual landowners. We requested permission to begin fencing at or near the high tide line and continue back into the dune grass, including at least some of the sparsely grassed area that provides habitat for Piping Plover and Least Tern chicks. Signs were placed around the perimeter of the symbolic fencing to alert the public to the nesting area and prevent potential impacts to nesting pairs from beach-goers (Appendix IV).

When a plover nest was found, if an exclosure was deemed suitable for the site and landowner permission was received, nests were protected with an exclosure. The exclosures consisted of approximately 50 feet of wire fencing with five metal posts spaced evenly throughout to support the fencing. The exclosure was placed around the nest so that once the exclosure was complete the plover nest would be in the middle of the circle. Blueberry netting was cut into 14-17' circles, or in some instances squares, and secured to the top. Any excess was bunched up and fastened tightly across the top of the fencing using zip ties to diminish the opportunity for entanglement. In sandy locations, exclosures were erected by a minimum of two people. Where the substrate was rocky or additional interns/volunteers were available, more people were used. Exclosures generally took no more than 20 minutes to erect from start to finish. Once the exclosure was completed, the behavior of the adults was monitored to see when and if they returned to the nest. Data on the time required to exclose a nest and on the return time for plovers were recorded on data sheets (Appendix V).

The USFWS guidelines for using exclosures to protect Piping Plovers state that exclosures should only be constructed after a full clutch of eggs has been confirmed. This guideline serves to limit abandonment from the disturbance caused during the erection of an exclosure. Exceptions may be approved by state agencies for beaches where egg predation is very likely. Maine's heavily developed beaches often provide easy access for predators, and thus we routinely construct exclosures around partial clutches. Data from previous years indicate that exclosing partial clutches has not caused abandonment of plover nests in Maine; most abandonments we observe are attributed to other factors such as dog or human disturbance. Data continues to be collected on abandonment of exclosed vs. unexclosed nests to evaluate potential problems.

Avian predators can use the exclosures to their advantage during hunting and potentially kill multiple adults. In instances when adults were taken and we were concerned for the remaining adults, exclosures were removed from nesting areas.

Concerns about exclosure use contributing to adult deaths in certain circumstances have worried plover managers in their recovery efforts for this species. Piping Plover biologists in Canada have decided to stop using exclosures to protect nests based on fears that adult loss with exclosures outweighs productivity gains from hatching chicks, however many biologists in the eastern U.S. (Maine included) continue to see population and productivity improvement at sites where exclosures are used. USFWS and plover biologists from the Atlantic coast are actively investigating whether exclosure use in our range is ultimately benefitting or harming our recovery efforts. An intensive workshop dedicated to strategic decision-making directed around exclosure use was held in December of 2013. A preliminary model based on a sample of data from Maine, Massachusetts, Rhode Island, and New Jersey indicates that in the Atlantic population, exclosures increases productivity at some sites. Research is ongoing

about what factors influence the benefits of exclosures to help managers make informed decisions about whether or not to use them, but in the meanwhile we will continue to use them at sites where they appear to be beneficial.

Electric Fencing

We used a solar-powered electric net fence, Premier One Electro-Stop II, around the primary Least Tern nesting site at Crescent Surf Beach and around parts of the Least Tern nesting site at Higgins Beach. The net fence does not protect against all predation events, but if installed and maintained with care, it is an important tool for protecting Least Tern and Piping Plover nests from mammalian predators. The charge on the net fence was checked with a digital volt meter every time the site was visited. Beach grass was cleared from the fence line on a regular basis. We found the voltage dropped on damp days, however for the majority of the time the charge was above 5,000 volts. The fencing was adjusted as the sand habitat altered and the tern colony expanded. This fencing also protects any unexclosed plover nests when they occur within the tern colony.

Predators

Intensive predator management provided by Wildlife Services began in 2007; after seven years of evaluation, the data suggest that average productivity rates are higher on beaches where predators are removed.

Any time nests of Piping Plovers or Least Terns were predated, every effort was made to identify the predator. Typically this was done using track identification. Various removal methods were used to manage predators at Ogunquit Beach, Crescent Surf Beach, Popham Beach and Goosefare Brook by Wildlife Services.

Game cameras were set up in 2015 to help identify problem predators at Ogunquit Beach and Goose Rocks Beach.

Public Outreach Programs 2015

Outreach programs are needed to raise public awareness on piping plovers, least terns, and migrating shorebirds and on the impacts of disturbance from recreational activities in coastal areas.

Our annual newsletter (Appendix VI) is one tool we use to reach members of the public who are currently involved in the project and to help others become more engaged. It is published at the end of the season and distributed to every beach-front landowner on beaches with either current or historic nesting plovers. The newsletter is also mailed to all collaborators including municipal officials, volunteers and agency personnel and is posted on the Maine Audubon website for public viewing. This year over 800 copies of the newsletter were distributed.

We conducted the following public outreach programs and reached thousands of beach-goers. The increased numbers of nesting pairs in 2015 (particularly on busy beaches such as Old Orchard) translated into fewer opportunities for traditional ‘tabling’ outreach--when we set up a table on the beach to educate the public--than in recent years. We were still able to reach large numbers of beach-goers

through some tabling efforts and through substantial efforts while on the beach doing our regular monitoring and management. Below are descriptions of specific activities we undertook at each beach. Beaches that benefited from intern presence or our tabling efforts have outreach numbers under each description. Interaction tallies for other beaches can be found at the end of the section.

Ogunquit Beach, Ogunquit
Most of our outreach efforts at Ogunquit were focused at setting up a table with the plover mounts and educational material at the footbridge near the public restrooms. We also provided casual on-beach outreach with spotting scopes and educational materials.
Ogunquit Outreach: 2,024 people

Moody Beach, Wells
On Moody Beach, a private beach, we roamed the beach with educational material to speak with landowners and renters in the early season. The chicks moved to Ogunquit when young, so later focused our efforts there.

Wells Beach, Wells
In years past we have set up a table at the entrance to Wells Beach; however, we did not do this in 2015. Instead, we spoke with and engaged people while simultaneously doing monitoring and management. Thanks to an active plover volunteer network, we found the public at Wells Beach increasingly knowledgeable about the plovers as volunteers had spoken with them already, and so we decided to spend our time tabling at other sites.

Goose Rocks Beach, Kennebunkport
Limited public access at Goose Rocks Beach makes tabling ineffective, though we do engage in casual 'on the beach' outreach and talk with beach-goers during visits. A University of New England (UNE) intern spent 20-30 hours a week on Goose Rocks engaging with beach-goers in May and June, and was extremely effective and successful with educational outreach this year.
Goose Rocks Outreach: 931 people

Fortunes Rocks Beach, Biddeford
Fortunes Rocks has been a challenging beach for outreach because people access the beach from many private entrances and it is a busy walking beach. Thanks to efforts from UNE interns, we had more time and energy devoted to outreach on the beach this year and greater success educating the public. Interns watched and monitored the birds, and also used scopes to watch birds while handing out educational materials.
Fortunes Rocks Outreach: 326 people

Hills Beach, Biddeford
Outreach at Hills is always challenging as there are many beach entrances, but we had interns from University of New England also spending time to connect with beach-goers here. Unfortunately, the plovers that nested in 2015 on Hills abandoned during incubation, outreach efforts were hampered and most efforts were dedicated to Fortunes Rocks. Even so, some people were educated on the beach by Maine Audubon and University of New England interns.
Hills Outreach: 26 people

Old Orchard Beach and Ocean Park, Old Orchard
Given the large number of nesting plovers on Old Orchard in 2015, biologists and interns spent a significant proportion of our time at Old Orchard this year managing, monitoring, and educating. We ultimately spoke to hundreds of visitors on OOB, though have no calculated number as visits were so frequent and education was casual. We encountered beach-goers that remembered us from previous years and the public works department also frequently educated people during their daily operations on the beach.

Pine Point, Scarborough
We trained Scarborough public works and some volunteers early on in the season. We also had one day of table outreach at the main municipal parking lot access, and spoke with people regularly while on the beach.
Pine Point Outreach: 170 people

Scarborough Beach State Park, Scarborough
We set up a table at the entrance to the State Park on the beach in a few times when birds were still nesting there and spoke with many beach-goers. The entrance to Scarborough Beach makes it more suitable for tabling outreach than other beaches in the area, and is generally a successful location if plovers are nesting.
Scarborough Beach Outreach: 623 people

Higgins Beach, Scarborough
Outreach at Higgins consisted of 'on the beach' education efforts; some were conversations during monitoring and management while others were actively trying to engage with visitors. The network of volunteer monitors at Higgins was active on the beach daily, and they connected with hundreds of beach-goers.

Crescent Beach State Park, Cape Elizabeth
Last year was the first time Crescent Beach hosted nesting plovers since 2004, and we found the public this year more informed than in 2014. We had some outreach success informally engaging people on the beach.

Seawall Beach, Phippsburg
Because of the long hike in to Seawall Beach/Morse Mountain, traditional outreach here is inefficient. We engaged with people on the beach whenever possible. Thanks to the posters and educational efforts of Bates College and the nature-oriented focus of many visitors here, we found beach-goers at Seawall to frequently be well-informed about the birds.

Popham Beach State Park, Phippsburg
In early June we trained lifeguards for all state parks at Popham Beach State Park. As the season progressed we staffed a table near the bathhouse, which continues to be a successful area for outreach and a prime beach to engage with the public. With several nesting pairs at Seawall Beach in 2015, we were unable to dedicate as much time to outreach at Popham this year, however when we set a table there it is well-received and effective.
Popham Beach State Park Outreach: 1,147 people

Rachel Carson National Wildlife Refuge Outreach Efforts
Outreach on Refuge managed beaches was conducted by both refuge staff and volunteer interns. During the 2015 season, outreach occurred by both casual encounters and planned activities. Casual encounters occurred primarily during beach monitoring. Planned activities occurred both on the beaches and at the Refuge's headquarters through a variety of mediums including educational tables and activities. In 2015, we engaged over 328 people who were recreating on the beach. Numerous other contacts were made in our front office during other non-plover specific events. A special Cooperative Recovery Grant (CRI) for Roseate Terns enabled us to reach out to over 8,000 people using social media, brochures and contacts on the beach and at our Headquarters. Migratory bird specific messaging included how to use the beach without disturbing birds, how to identify migrants, and the values of a healthy beach.

RCNWR's CRI based outreach: **8,196**

Outreach totals from above are totaled with the following additional outreach efforts.

Training Outreach at all beaches (public works, municipal officials, lifeguards, etc.): **120**
Outreach by Staff Naturalist (in classrooms, events and field trips, beach time, etc.): **403**
Additional outreach all beaches (during management and casual on-beach education by biologists and interns.): **1,875**

Total Outreach Numbers for Maine Audubon in 2015 (trainings, beaches, Staff Naturalist): 7,645
Total of all Outreach Numbers for coastal birds by RCNWR and Maine Audubon: 16,169

Law Enforcement

For the sixth year in a row, Maine Game Wardens patrolled beaches, helping to protect Piping Plovers throughout the nesting season. Forty-three details (patrols) were conducted at beaches from Ogunquit through Reid State Park in Georgetown. Patrols began in late May and continued through the middle of August. As with previous years, patrols were conducted during early mornings and evenings during the week, and on weekends and holidays. The Refuge Officer at RCNWR conducted numerous patrols on Refuge beaches, with a special focus at Goosefare Brook.

Prior to conducting any patrols, all Maine Game Wardens were required to attend a training session on Piping Plovers and Least Terns. This field training included identification, life history, nesting behavior, migration, population estimates, recovery and productivity goals, and threats to the population. We had a total of at least fifteen Game Wardens trained and conducting patrols.

Game Wardens interacted with hundreds of people, and once again we received a tremendous amount of positive feedback from people at all the beaches where the wardens patrolled. The primary purpose of game warden patrols was to prevent “take” or harassment of plovers by people or domestic animals. Although the Warden Service did an outstanding job educating the public, they did have to issue verbal warnings. Their presence is essential in helping the public understand the rarity of these birds and the seriousness of potential harm.

In previous years dogs had been identified as the cause of nest failure for several nests and caused direct mortality of adults and chicks. The Warden Service did an outstanding job interacting with dog owners; consequently impacts to plovers and terns from free ranging dogs were reduced.

RESULTS AND DISCUSSION

Least Terns

On June 10th a coordinated statewide least tern census documented a minimum of 233 Least Tern pairs within the State of Maine. During the state-wide count 138 of those Least Tern pairs nested at Crescent Surf while 69 nested on Stratton Island, 25 nested at Higgins Beach, and one nested at Popham Beach. At all sites, nesting was just beginning during surveys, and biologists believed more pairs nested after the Gulf of Maine Seabird Working Group (GOMSWG) state-wide census window closed. Later in the season there were at least fourteen pairs at Popham, 95 at Stratton, and six pairs at Laudholm Beach in Wells. The nesting colony at Crescent Surf increased in size throughout June, however another nest survey was not feasible because it would have disturbed plover chicks. Crescent Surf produced a minimum of 144 fledglings, Higgins Beach produced 13 fledglings, and a minimum of four fledged from Popham. The colony on Stratton Island and the small colony on Laudholm both failed due to predation. State productivity was estimated to be 0.69 fledglings per pair, which was driven largely by a very successful year on Crescent Surf.

Site Summaries for Least Terns

Following are summaries of Least Tern population estimates, comparisons to other years, and predator controls used (if any) by beach, with the primary monitoring organization or agency listed under the name of each beach.

Wells Beach – Wells
Maine Audubon

Population Estimate: No terns attempted to nest at this site. Common and Least Terns were regularly seen feeding over the Webhannet River and marsh. Least Terns were observed flying over the beach and harbor.

Comparison: There have been no nesting terns on Wells beach since one pair produced one fledgling in 2007. In 2005 ten pairs of Least Terns scraped but never nested. Fifteen nesting pairs produced 10 fledglings in 2004.

Predator Management: None.

Laudholm Beach – Wells
RCNWR

Population Estimate: 6-12 pairs seen; six pair nested. These pairs likely moved to Laudholm from Crescent Surf after a particularly high tide/ flooding event.

Comparison: 4 pairs nested at Laudholm in 2014 and fledged a total of 1 chick. This year a predator (likely a raccoon) consumed all the eggs before they had a chance to hatch. There did not appear to be any attempts at re-nesting.

Predator Management: No predator control was conducted though Wildlife Services removed predators at nearby Crescent Surf Beach. An unpowered net fence was put around the nests for a portion of the nesting period, mostly for protection from humans, though it may have helped keep mammalian predators away as well. A non-electrified fence surrounded the nests, however it was breached.

Crescent Surf Beach – Kennebunk
RCNWR

Population Estimate: There were 138 active nests during the statewide least tern census on June 10th. This was likely not a complete count, however, we were unable to do a second survey due to the large numbers of young plover chicks on the beach. Our final estimate is >144 fledglings for a productivity of 1.04. Simultaneous beach surveys were conducted on July 13th and July 27th for a fledgling count of 29 and 138, respectively. It was difficult to observe younger chicks as they were mostly concealed in the dune grass.

A fox was able to get inside the solar powered electric net fence, however the incident occurred prior to least tern chick hatching and the fox did not appear to predate any least tern nests. Otherwise, the net fence was successful in deterring predators.

Comparison: In 2014 there were 164 least tern nests but due to a number of extreme weather events these nests only produced 29 fledglings for a productivity of 0.18. In 2012 and 2013 the productivity was approx. 0.7 on Crescent Surf. Productivity was poor between 2003 and 2007. The steady growth of the least tern population is likely due to the intensive wildlife management actions on these productive mainland beaches and at Stratton Island.

Predator Management: Wildlife Services removed specialist predators from the Crescent Surf Beach area throughout the breeding season. The majority of the nests were within a solar powered electric net fence to prevent them from being predated.

Goose Rocks Beach – Kennebunkport
Maine Audubon

Population Estimate: No Least Terns nested at Goose Rocks in 2015. In June and July, Least Terns were observed flying around the spit and foraging in the mouth of the Batson River, though no nesting attempts were made.

Comparison: In 2011 a season high of 46 birds was documented and produced a minimum of 12 fledglings. In 2010, a small colony set up after failures at Crescent Surf and Stratton, however no chicks survived.

Predator Management: None.

Western/Ferry Beach – Scarborough
Maine Audubon

Population Estimate: No Least Terns attempted to nest at Western Beach in 2015. Least Terns were observed feeding over the Scarborough River; these birds were likely breeding at Stratton Island and Higgins Beach.

Comparison: Terns have not nested on Western Beach since 2008, and the site has not fledged chicks since 2005 when there were a total of 40 active nests. Prior to 2005, Least Terns had not nested at this site since 1981.

Predator Management: None.

Stratton Island – Scarborough
National Audubon Society

Population Estimate: During the GOMSWG window count, 69 tern nests were observed and a high count of 95 nests was counted shortly after the window. Despite the substantial colony, no chicks survived more than a few days on Stratton due to heavy predation by one or two Black-crowned Night-herons and the colony failed completely.

Comparison: The first year Least Terns nested on Stratton Island was in 2005, with 18 pair and nine fledglings. There was a high of 113 pair and 108 fledglings in 2007. In some years, predation by specialist herons can be a problem.

Higgins Beach – Scarborough
Maine Audubon

Population Estimate: A high of 95 adults were observed on Higgins Beach, though only 25 nests were observed at one time.

Least terns appeared on Higgins beach on May 20th. The initial nests were established just west of the IF&W property. Shortly after the first nests were observed, an electric net fence and least tern decoys were placed on IF&W property. Over the course of the season, the colony shifted eastward, and initial nests were lost to crows and foxes.

A high 95 adults was seen on July 10th during an excellent foraging event, but 60-75 adults were more commonly observed. The highest nest count on Higgins was observed during the GOMSWG window nest count (June 10th), when we found 25 nests. However the colony was still growing at this point as we saw many fresh scrapes; from early June through early August we saw frequent new nests, with no readily identifiable nesting waves.

Due to the difficulties posed by asynchronous hatching and movement between sites, we very conservatively estimate that a minimum of 13 chicks fledged from the Higgins Beach colony this year.

The true number could be considerably higher, with eight fledglings, twelve chicks, and seven nests observed on Aug. 10th. Least Tern chicks and fledglings were still being fed on September 1.

An active volunteer group at Higgins played a large role in helping protect and monitor birds at Higgins, including assistance with electric fence management.

Comparison: In 2014 at least 11 Least Tern pairs nested on Higgins Beach. The colony was destroyed by a fox before any chicks fledged. No nesting attempts were made between 2010 and 2013. In 2009 a minimum of 16 nesting pairs were observed. All nests were predated and the colony was abandoned. In 2008 there were no nesting pairs. Scraping was seen in 2007, but no nests were established. In 2006, a single nest was abandoned. Higgins hosted successful colonies in 2003 and 2004, fledging 53 and 54 chicks respectively.

Predator Management: Electrified net fence.

Ram Island, Breakwater Beach – Cape Elizabeth
Maine Audubon

Population Estimate: No Least Terns nested on any Ram Island Farm beaches in 2015.

Comparison: Five Least Tern pairs nested on Ram Island in 2012, and at least one fledgling was produced. The only other time since monitoring began in 1977 that Least Terns nested on Ram Island was in 1985, when eight pairs of terns nested, but did not fledge any chicks.

Predator Management: None.

Seawall Beach, Morse Mountain – Phippsburg
Maine Audubon

Population Estimate: No Least Terns were observed at this site.

Comparison: No birds have attempted to nest on Seawall Beach since 2005. That year a 17 nest colony was decimated by a fox or coyote.

Predator Management: None.

Popham Beach State Park – Phippsburg
Maine Audubon

Population Estimate: Although only one pair was documented nesting during the window count on June 10th, there was consistent Least Tern activity on Popham in 2015. Least terns were first observed foraging over the Morse River on May 19th. A larger flock of terns (around 40 individuals) and courtship behavior was observed on May 26th. The nesting colony settled in the sparsely vegetated washes of the sandspit and the seaward edge of open sand. A peak count of 14 nests was seen on July 7th, though surveying was difficult throughout the nesting process, in part because three plover broods sought cover within the tern colony. Three LETE chicks fledged and left with around 20 adults during

the first week of August. An additional fledgling, a chick, and an active nest were observed with the remaining 20 adult terns on Aug 13th, making a total of four fledglings.

Comparison: In 2014 Popham had a high of seven pairs nesting at any one time, and six chicks survived to fledge. Three Least Tern pairs nested on Popham in 2013 with no fledglings, and two pairs nested in 2012, fledging three chicks. Prior to that, no birds have attempted to nest on Popham Beach since 1997, when a 15 pair colony failed to produce fledglings.

Predator Management: Wildlife Services removed specialist predators from Popham Beach in 2015.

Reid State Park – Georgetown
Maine Audubon

Population estimate: No Least Terns nested on Mile or Half-Mile Beach in 2015.

C*omparison:* Least Terns have not nested at Reid State Park since 2006. A single nesting pair was documented in 2006, but no fledglings were produced.

Predator Management: None.

Piping Plovers

Sixty-two pairs of plovers nested at 20 (21 if one splits Ocean Park from Old Orchard Beach) Maine beaches in 2015 (Table 4). These 62 pairs produced 121 fledglings, the largest number of chicks fledged off of Maine's beaches since consistent record-keeping began in 1981. Maine plovers had an average of 1.95 chicks/pair (Table 3) and 61% chick survivorship (Table 7). Overall, 69% of eggs successfully hatched (Table 7). Of the 75 nesting attempts in 2015, four were lost to tide, four were abandoned prior to hatch and eleven nests were predated (Table 5). Forty-one of the 75 nesting attempts were exclosed (Table 6), although five additional nests were exclosed but immediately removed when an adult flew off the nest. Thirty-four of the exclosed nests successfully hatched, two exclosed nests were abandoned and five exclosed nests were washed by storm tides (Table 6). Of the 34 unexclosed nests, nineteen hatched, and eleven were predated (Table 6). Crows predated five of those nests, while two were likely skunk and the remaining two were destroyed by an unknown predator (Table 6).

Exclosures were not erected for some nests at Ogunquit, Old Orchard, Pine Point, Crescent Beach State Park, and Reid State Park because the nests were located on the steep dune and did not permit an exclosure. Exclosures were not used on several nests located at on Popham, Western Beach, Pine Point, Fortunes Rocks, Crescent Surf, and Ogunquit due to dense vegetation and adults frequently flying off the nests. One nest at Wells was not exclosed because it was located in dense cobble where fencing was impossible. Two were unable to be exclosed because of landowner wishes, one remained unexclosed because it was predated before it could be exclosed, and one washed by tide before it was able to be exclosed.

Predator management measures were conducted by Wildlife Services biologists at four sites with nesting Piping Plovers: Ogunquit, Crescent Surf, Goosefare Brook, and Popham Beach State Park. Wildlife Service activity at Ogunquit was greatly constrained by intense human activity.

The number of Piping Plover nesting pairs increased 24% from 2014 to 2015, from 50 pairs to 62 pairs (Table 4). This increase indicates that our intense management and high productivity from previous years has been effective in increasing Maine's plover population. High egg hatchability (69% due to low nest predation) and a high proportion of chicks fledged (61%) from those nests that hatched translated into good productivity.

Last year we began to see plover nesting more equally distributed among several sites after many years where most of Maine's plovers were concentrated at a handful of locations. The trend of increased nesting distribution continued in 2015, with seven beaches hosting at least five nesting pairs (Table 4). This distribution of plovers across beaches is unusual; in the historic population highs of the late 1990s and early 2000s, typically only four beaches had five or more nesting pairs. For the seventh consecutive year Crescent Surf Beach produced more fledglings than elsewhere in Maine (18 fledglings, 14.8% of Maine's fledglings), although Old Orchard Beach (including Ocean Park) had only one fewer and fledged 17 chicks. (Table 4). Old Orchard Beach was host to the greatest number of nesting plovers this year (nine pairs). The recovery of Maine's plover population and subsequent re-colonization of sites is encouraging as the population grows and disperses; this more widespread nesting distribution is important for future success as it takes pressure off a few sites and makes for a more stable population.

Piping Plover activity (nesting, foraging, staging, brood rearing) was observed on 26 out of the 28 sites regularly monitored by Maine Audubon and RCNWR (Table 8).

GPS coordinates were collected for each nesting attempt (Appendix VII) and maps of brood locations and movements were sent to the MDIFW to produce GIS maps for the project (Appendix VIII).

Site Summaries for Piping Plovers

Ogunquit Beach – Ogunquit
Maine Audubon

Five pairs of Piping Plovers nested on Ogunquit beach in 2015. Four successful nests yielded a total of eight fledglings. Though the presence of 5 pairs was observed as early as the first week of May, two pairs did not establish nests until early June. This delay could be due to a number of factors including pressure by crows and maintenance/construction projects on the beach in prime nesting habitat.

Pair one nested in open sand in front of the sewage treatment plant. The nest was exclosed and fledged three chicks on June 30th.

Pair two nested near beach marker #3 directly under wooden snow fencing. The nest was unable to be exclosed. All four eggs hatched, though only one chick fledged on July 11th.

Pair three nested near beach marker #2, also directly under wooden snow fencing. The nest was unable to be exclosed and predated around June 17th.

Pair four nested between beach markers #7 and #8. The nest was against a wooden post and was unexcloseable. The nest was buried by blowing sand during the major storm on June 28th. The eggs were uncovered and hatched on the afternoon of July 4th. A volunteer had the only sighting of this brood before they were lost.

Pair five nested between beach markers #5 and #6. The nest was in the open sand and was exclosed. All four chicks fledged on July 31st.

Limited predator management was conducted by Wildlife Services on Ogunquit Beach in 2015.

Moody Beach – Wells
Maine Audubon

Moody Beach hosted one nesting pair of plovers just south of Bourne Ave. Scrapes were found as early as April 20th, and a nest was discovered two weeks later. The four-egg nest was exclosed on May 11th, and hatched on June 5th. The brood travelled toward more suitable habitat close to the Ogunquit town line within a week of hatching. The adults were very protective, and physical altercations were seen between them and pair #1 from Ogunquit.

The pair fledged 2 chicks on June 30th.

Drakes Island – Wells
Maine Audubon

One pair nested on Drakes Beach, with scrapes observed as early as May 11th. The nest was found on May 21st at the southern end of the dunes, in front of Bittersweet Lane. The nest was situated in cobble and was not possible to exclose. Four eggs hatched on June 22nd, and 3 chicks survived to fledge.

Wells Beach – Wells
Maine Audubon

Wells beach had a total of six nests laid by 5 pairs of plovers.

Nest 1 between public ways (PWs) 7 and 8 was abandoned a few days before its hatch date of June 5th. Dog tracks were noted inside the stake and twine at the time of abandonment.

Nest 2 in the 'blowout area' by PW 14 fledged 3 chicks on approximately July 1st. The nest was unexclosed because the birds were observed flying off the nest.

Nest 3 was between public ways 10 and 11; this pair fledged all four chicks on July 9th.

Nest 4, south of public way 7, disappeared between May 27th and June 3rd. There were cat tracks in the area and people feeding gulls bread nearby at the time of the nest loss. The nest was unexclosed due to cobble.

Nest 5 was laid far behind the dune's edge in on a bald spot adjacent to a private pathway, about 150 feet behind the beach. It was discovered when we observed birds flying inland from the dune edge towards the nest, and was predated before it could be exclosed.

The pair from Nest 5 was able to re-nest just north of the blow-out area. A single adult raised one chick from Nest 5A and disappeared about a week before fledging. The chick continued to stay in the area until it fledged.

Laudholm Beach – Wells
Rachel Carson NWR

Laudholm Beach had 1 nesting pair that produced 4 fledglings in one nesting attempt. A second pair arrived in June on the beach and acted defensive and territorial but no scrapes or nests were ever located.

Nest 1 hatched 4 eggs and produced 4 fledglings. A one egg nest was found and exclosed on May 7th. It took 15 minutes to set up the exclosure due to the very rocky substrate but neither bird was around at the time and did not seem affected by the disturbance. A full clutch was observed on May 13th and all four eggs hatched on June 9th, one day earlier than expected. All four chicks fledged on July 4th.

Crescent Surf Beach – Kennebunk
Rachel Carson NWR

Seven pairs nested on Crescent Surf. Each nest hatched all 4 eggs although only 18 chicks fledged for an overall productivity of 2.6. An additional pair was observed scraping late in the season; likely the pair from nest 4, which lost all of its chicks. Six of the seven nests hatched earlier than expected.

Nest 1 hatched 4 eggs and produced 4 fledglings. A one egg nest was found and exclosed on April 27th. This nest was outside the symbolic fencing on private land. A full clutch was observed on May 4th and the eggs hatched on May 29th, two days earlier than expected. All chicks fledged on June 24th.

Nest 2 hatched 4 eggs and produced 4 fledglings. A one egg nest was found on April 28th and exclosed on April 30th. A full clutch was observed on May 5th. All four eggs hatched on May 30th – three days earlier than expected – and fledged on June 25th. The female bird was banded in Hilton Head, SC in January 2013 by Virginia Tech. She fledged four chicks from Crescent Surf in 2013 and three in 2014.

Nest 3 hatched 4 eggs and produced 4 fledglings. A four egg nest was found on May 11th and exclosed on May 12th. All four eggs hatched on May 7th. Due to heavy harassment by terns, this brood moved south down the beach and ultimately moved into the area behind the dune. All four chicks fledged on July 2nd. Nest 3, 4, and 7 were in close proximity to each other.

Nest 4 hatched 4 eggs and produced 0 fledglings. A one egg nest was found on May 11th and exclosed on May 12th. A full clutch was observed on May 16th and all four eggs hatched on June 13th, a day later than expected. All four chicks were spotted a few days after hatching, however, a fox broke into the electric fence around this time and the chicks were not spotted afterwards. The adults continued to display and act territorial for nearly 10 more days.

Nest 5 hatched 4 eggs and produced 2 fledglings. A one egg nest was found and exclosed on May 14th. Although one adult performed a broken wing display for nearly the entire time the exclosure was being set up, it returned to the nest immediately. A full clutch was observed on May 22nd and all eggs hatched on June 16th, three days earlier than expected. All four chicks were seen the evening of the 16th. One to three chicks were observed each day between June 17th and June 22nd at which point there appeared to be only 2 chicks. Only 2 fledglings from this brood were ever spotted. They fledged on July 11th.

Nest 6 hatched 4 eggs and produced 2 fledglings. A one egg nest was found and exclosed on May 14th, although the exclosure was removed on May 19th because the adult was flushing up into the blueberry netting. Due to the nest's location in dense vegetation, only one technician ever checked this nest. A full clutch was observed on May 20th and all four chicks hatched on June 16th, one day earlier than expected. Only 2 chicks were spotted following a weather event over the weekend of June 27th. One

dead (likely drowned) chick was found on the beach near the Nest 6 brood. Two chicks fledged on July 11th.

Nest 7 hatched 4 eggs and produced 2 fledglings. A one egg nest was found and exclosed on May 18th. A full clutch was observed on May 24th and all four eggs hatched on June 18th, three days earlier than expected. All four chicks were never seen at the same time; this brood hid in the dune vegetation and the chicks were rarely spotted. The adults continued to be highly territorial and performed broken wing displays in a specific area of the beach. Two fledglings of the right age were spotted on July 14th and were assumed to be from this nest.

Nests 2-7 were within the solar powered electric net fence.

Parsons Beach* – *Kennebunk
Rachel Carson NWR

A pair was seen scraping north of the sea wall between June 3th and June 7th, however by June 8th only 1 plover was ever re-sighted and had ceased to act territorial. The scrapes were on private land on which the landowner would not permit stake and twine fencing. There was heavy dog presence on this beach throughout the season. Although scrapes tend to be observed there each season, Parsons Beach has not had a nesting pair since 2011.

Marshall Point* – *Kennebunkport
Rachel Carson NWR

Active scrapes were observed between May 22nd and May 28th. Although multiple plover adults were seen at this beach, there appeared to be only one pair. No plovers were seen after June 1st. There was a high level of predator (mammalian and avian) activity at this beach and there have been no plover nests here in recent years.

Goose Rocks Beach – Kennebunkport
Maine Audubon

Five pairs of Piping Plovers nested on Goose Rocks Beach in 2015.

Nest 1 was located on the western end and hatched in late May and fledged four chicks promptly on June 22nd.

Nest 2 was also located on the western end, though it was inside the fenced yard of a landowner. The nest hatched four chicks which were not seen after they were around 10 days old. The chicks reappeared a week later, then disappeared once again and were not seen after that. While the brood was young, they were seen foraging on the mud flats at the Batson River spit. This year the low tide left expansive mud flats, and it is possible that the brood was foraging far out from the beach and was caught by the tide at some point.

Nest 3 was located on the ‘public beach’ at the eastern end, on Kennebunkport Conservation Trust land. Only 3 eggs from the clutch hatched. The nest fledged 1 plover, which moved to the far eastern end of the beach.

Nest 4 on the western end hatched in early July, and fledged four chicks on August 2nd.

Nest 5 was on the eastern end on private property. The clutch was 3 eggs, but only 2 chicks were ever seen. At 3 weeks old, they moved to the Batson River spit end, and only a single chick was seen with the adult from that point. It fledged on August 20th.

Fortune's Rocks Beach and Hattie's Beach – Biddeford
Maine Audubon

Four pairs of Piping Plover nested on Fortunes Rocks Beach in the "Middle Beach" or Biddeford Pool Beach area.

Nests 1 and 2 were both unexclosed, Nest 1 adults flew off nest and Nest 2 was located on steep dune. One adult was observed flying directly off the nest in June when a helicopter landed in the front yard of the landowner's property, validating our decision. Nests 1 and 2 hatched, producing one and four fledglings respectively and both nests fledged on June 29th. Nest 1 lost three of its chicks very early on.

Nest 3 hatched and the brood was seen foraging far west of the nest site in front of seawalls before disappearing altogether, possibly due to lunar high tides.

Nest 4 was laid at the end of June and was only seen once before it was washed by the tides.

Early in the season a pair of adult Piping Plovers was seen foraging on Hattie's Beach (municipal beach), but they were not seen after May 28th.

Hills Beach – Biddeford
Maine Audubon

One pair of piping plovers nested on Hills beach in 2015. The nest was adjacent to a public way across from 110 Hills Beach Rd. The nest was exclosed on June 3rd and given a large stake and twine buffer. It was abandoned at some point between June 9th and 16th. Fox tracks were seen around the exclosure on 6/9. Both adults foraged far from the exclosure and tended the nest poorly.

Ferry Beach – Saco
Rachel Carson NWR

Some plover activity was observed in spring at Ferry Beach, though no plovers nested. The brood that hatched north of Goosefare Brook in Ocean Park traveled south; they were ultimately raised and fledged from Ferry Beach at the end of July.

Goosefare Brook – Saco
Rachel Carson NWR

Nest 1 hatched 4 eggs and produced 2 fledglings. A two egg nest was found and exclosed on May 22nd. A full clutch was observed on May 25th and all four eggs hatched on June 19th, 3 days earlier than expected. Only two chicks were ever spotted after June 24th; it is unclear what happened to the others. This brood moved back behind the dune (likely to avoid people and possibly dogs) and both chicks fledged on July 13th. This beach had changed dramatically since the previous year, where in the fall the beach was expansive. The mouth of the brook appeared to switch from the hardened side to the beach side and eroded much of the dune.

A brood arrived from Ocean Park on July 13th with 1 chick. It ultimately moved south onto Ferry Beach. This chick fledged on July 30th.

Ocean Park – Old Orchard Beach
Maine Audubon

One pair of Piping Plovers nested on Ocean Park just north of Tunis Ave. This was a renest by pair 8 from Old Orchard Beach. The nest was found on June 7th. On June 9th, we started to exclose the nest but stopped due to an adult flying off the nest. All three eggs hatched on July 5th, and the brood crossed the Goosefare Brook in to Saco approximately one week after hatching. Two chicks disappeared during their move and one chick fledged.

Old Orchard Beach – Old Orchard Beach
Maine Audubon

As many as nine pairs nested on Old Orchard Beach (OOB) at one time in 2015, the most on any beach for the season and the highest number nesting on OOB since monitoring began.

A pair was observed scraping diligently in front of the Royal Anchor Resort by April 14th, though the first egg was not laid until May 1st. Black plastic erosion fencing on the beach was placed by the landowner and we believe delayed nesting. Nest 1 fledged one bird on June 28th.

Nest 2 was near the Friendship Inn. Three chicks hatched and two fledged on June 29th.

Nest 3 was located closer to the Pier than other nests by Brown Ave. In spite of the busy location all four chicks hatched on June 9th. The adults moved their chicks north away from the pier soon after hatching and fledged 3 birds on July 4th.

Nest 4 was just north of the Saunders Ave beach access, fledged three birds on June 29th.

Nest 5 was located on the northern stretch of Old Orchard near the Scarborough line, fledged all four chicks on July 6th.

Nest 6 was south of the Saunders Ave beach access. As the exclosure was being put up to protect the nest, the bird went inside and flew off the nest so it was immediately removed and remained unexclosed. Four chicks hatched, three of which fledged on July 7th.

Nest 7 was laid very low on the beach near the Scarborough Town line. It was discovered by a volunteer on May 17th washed away during high tides within days.

Nest 8 was unexclosable in a dune just south of the pier near the Kebek 3. It was predated within two weeks. The pair moved to Ocean Park and re-nested successfully.

Nest 9 was on the north end of OOB near Sand Dollar Ave, and disappeared a few days after hatching. We believe the chicks washed due to lunar high tides and a severe storm event that killed other broods elsewhere.

Pine Point Beach – Scarborough
Maine Audubon

Four pairs of piping plovers nested on Pine Point in 2015. Two pairs hatched nests and yielded four fledglings.

The first pair nested near the Jetty. The nest was in grass and too near to the dune edge to exclose. The nest was predated around May 14th. During nesting this pair had been seen flying across the Scarborough River to forage. It is likely this pair abandoned Pine Point for Western Beach, where they

successfully nested (see Western Beach entry). Volunteer monitors also reported both dog and human activity very near this nest during incubation.

A pair of piping plovers nested in front of the Holiday House Hotel (106 East Grand Ave.). The nest was close to the dune edge and unexclosed. Only three eggs were laid. All eggs hatched and three chicks fledged on July 2nd. This brood moved between the nest area and Old Orchard Beach regularly.

A third pair of plovers nested just south of Bliss St. public way. The nest was at the steep dune edge and unexclosed. Four eggs were laid, but only one hatched. The chick and both adults moved north to the Snowberry Park area shortly after hatching and were mostly observed there until the chick fledged on July 16th.

A fourth pair of piping plovers nested on Pine Point after a failed nest attempt on Old Orchard Beach (lost to overwash - see OOB entry). This pair had two attempts on Pine Point, both near the Holiday House. The first was exceptionally low on the beach and was quickly overwashed on June 1st. The second attempt was higher on the beach profile and in dense grass. It was predated by crows on June 9th. Neither nest was exclosed.

Western/Ferry Beach – Scarborough
Maine Audubon

Two pairs of plovers made three nesting attempts on Western Beach this year. This was the first time Western Beach hosted nesting plovers since 2009, and it corresponds with a completion of the dredge at the mouth of the Scarborough River where dredge spoils were deposited on the beach.

Nest 1 was laid on very high back dunes and was unable to be exclosed. It was predated in about a week. Fox tracks were seen consistently on the high dunes and this was the likely reason for disappearance.

The pair renested successfully as Nest 1A further on the beach towards Ferry where it was able to be exclosed. All four chicks hatched and three fledged.

Nest 2 hatched four chicks and successfully fledged three birds in around August 7th.

There were no nesting birds on Ferry Beach. Early on in the season, there were some plover tracks observed.

Scarborough Beach– Scarborough
Maine Audubon

One pair nested on Scarborough Beach this year in front of the Iler property northeast of the State Park. Four chicks hatched but the brood lost a single chick early on to an apparent eye injury. After a couple weeks brood moved to the Prout's Neck side of the beach, just out of bounds of the state park. The three remaining chicks fledged July 20th.

Higgins Beach – Scarborough
Maine Audubon

Three pairs of Piping Plovers made five nesting attempts at Higgins in 2015.

Nest one was laid in early May but was lost to crows before it could be exclosed. The pair renested but Nest 1a was lost to a high tide. The pair renested a third time, but abandoned Nest 1b shortly before estimated hatching. The nest was not exclosed or protected by symbolic fencing because

the landowner did not permit it. Heavy Least Tern activity during incubation may have disturbed the pair.

Nest 2 was in the path to the beach access path from White Sands Lane, and all four of the chicks fledged on July 15th.

Nest 3 was on the IFW-owned section of beach and was washed by high tides days before estimated hatching.

Ram Island – Cape Elizabeth
Maine Audubon

Hanson House/Breakwater Beach

Ram Island had two nesting attempts in 2015; we assumed for data records that they were both by the same pair as one attempt was after another, but it is possible that these nests were from two different pairs as they demonstrated very different behavior.

Nest 1 was on what we called 'Middle Beach'; the small pocket beach just west of Hanson House. The nest was never well-tended and was abandoned despite no exclosure.

Nest 2 was on Breakwater/Strawberry Beach and hatched four chicks on July 15. All four chicks survived for weeks but we lost two right before fledge, and the two remaining chicks fledged on August 10th.

Nano's Beach

Plovers were frequently observed foraging on Nano's Beach in 2015, though no nesting activity was seen.

Crescent Beach State Park – Cape Elizabeth
Maine Audubon

Two pairs of piping plovers nested on Crescent beach this year. Both nests were high on the dune and un-excloseable. The nests straddled the creek east of the park entry.

Nest 1 hatched four chicks on June 26th, though two were likely lost in the large storm on June 28th. The remaining two chicks fledged on July 21st.

Nest 2 was predated by fox shortly after discovery on May 22nd. The pair was seen scraping after the loss of the nest, but only one bird from this pair was seen from May 29th on. On May 29th, a single adult was seen performing alarm calls along the entire length of the beach and at the water's edge. This behavior has been seen before elsewhere after the loss of a large fledgling to an avian predator, and we speculated about a possible adult predation event.

Head Beach – Phippsburg
Maine Audubon

No Piping Plovers were observed at Head Beach in 2015.

Seawall Beach (Morse Mountain) – Phippsburg
Maine Audubon

Six plover pairs made seven nesting attempts on Seawall Beach in 2015.

Nest 1 was at the end of the Sprague River spit. We believe that all four chicks hatched but were lost immediately. Chicks themselves were not observed, though extensive plover tracks and adult behavior indicated they had hatched and disappeared on June 16th.

A late nest was close to the Nest 1 location and we assume that it was a second attempt from Nest 1, though it could be a new pair as it is atypical for birds to re-nest after losing chicks. Nest 1a hatched three chicks and fledged all three on August 18th.

Nest 2 was a few hundred meters southeast of the beach entrance. Four chicks hatched on June 21st and three successfully fledged on July 16th.

Nest 3 was found on the Morse River spit. One of the adults was banded with an unusual combination: upper right leg- orange; upper left leg- Aluminum; lower left leg - orange and green triple split striped. Contacts in the Great Lakes identified this as a bird that had fledged from Apostle Islands National Lakeshore in Wisconsin in 2013. Unfortunately, this rare visitor did not introduce new genetic material from the Great Lakes population as the four chicks were lost in the storm/tide event on June 28th.

Nest 4 was on the southwestern section of beach and was unable to be exclosed because of its location on the steep dune. Three chicks fledged on July 24th

Nest 5 was on the Morse River spit. Four chicks hatched and two of them fledged by July 13th.

Nest 6 was on the southwestern section of beach in front of the 'big dune'. Three chicks were observed flying days before their estimated flying date.

Popham Beach State Park – Phippsburg
Maine Audubon

Five pairs of Piping Plovers nested on Popham beach in 2015. The vegetation on the dune where they were most observed was very thick and it was often difficult to determine which broods were from what nest and to get an accurate estimate of birds.

Nest 1 was located in dense vegetation on the sandspit. The adult was seen flying off the nest and it was not exclosed. The nest hatched four chicks on June 14th and fledged three on July 7th.

Nest 2 was located in an unusual site at the center of the beach heading towards Fox Island, and it was exclosed. They were seen consistently on the shore side of the spit, and fledged all four chicks around July 14th.

Nest 3 was located in the 'washed out' area of the spit. It was unexclosed. Three chicks were fledged around July 7th.

Nest 4 was laid in thick beach pea and was unexclosable. It hatched four chicks but the brood disappeared. The four chicks that fledged July 14th that we assumed were from Nest 1 may have been from Nest 4 as the nests hatched a few days apart, though for all records we consider the brood lost from Nest 4.

Nest 5 was discovered June 19th, and was exclosed. The nest was buried by blowing sand on June 28th in a major storm. The birds did not re-nest.

Predator control was conducted by USDA APHIS Wildlife Services at Popham in 2015.

Hunnewell Beach – Phippsburg
Maine Audubon

No Piping Plovers were observed at this site this season.

Indian Point – Georgetown
Maine Audubon

No Piping Plovers were observed at this site this season.

Reid State Park – Georgetown
Maine Audubon

Half Mile Beach

Three Piping Plovers were first observed on Half mile beach on April 21st. One pair remained and nested about one hundred feet from the end of the beach on May 21st. The nest was unsuccessfully exclosed on May 28th due to an adult flying off the nest. The nest was predated on June 6th. The pair was frequently observed feeding on the mudflats on the back beach and appeared relatively inattentive to the nest before predation. They did not renest.

Mile Beach

One plover pair initiated a nest on Mile Beach on May 5th near the center of the beach and high on the profile. The pair was observed flying on and off the nest, so an exclosure was not feasible. On June 2nd, the nest was predated, and a second nest was initiated within one week, and exclosed successfully on June 12th. The second nest was located lower on the beach profile, and was destroyed during a storm high tide on June 28th.

Casco Bay Island Beaches
Maine Audubon

In 2015, Maine Audubon (with support from USFWS) surveyed some of the larger Casco Bay island beaches during the week of the International Piping Plover Census. No Piping Plovers or Least Terns were sighted, though habitat at a number of sites was certainly suitable. Beaches on Great Chebeague, Little Chebeague, and Long Island were surveyed (see map below).

CONCLUSIONS AND RECOMMENDATIONS FOR 2016

Intensive field work, predator management, law enforcement and active beach outreach programs continue to aid in the recovery of Maine's Piping Plover and Least Tern populations. This year's increase in breeding pairs of Piping Plovers and Least Terns indicates the current management program is benefitting both species. Our work is also benefitting other species of concern, including the federally *endangered* Roseate Tern during staging and migration, migrating federally *threatened* Red Knots, and other migrating shorebirds. The increase in the breeding population of 24% for Piping Plovers from 2014-2015 is substantial and greater than anticipated, giving Maine the second largest number of nesting plovers since monitoring began in 1981. As our population continues to recover, we expect the population size to level off and stabilize, though we still have not reached the 2002 high of 66 pairs.

We recommend the following for 2016:

Electric Fencing

The solar-powered electric net fence used at the tern colony at Crescent Surf that also encompasses the nesting area for plovers benefits both species, and has played a role in the consistent success of plovers and terns at that site. A new net fence at Higgins Beach in 2015 was pivotal to the success of nesting terns, and should be expanded in future years as the colony expands. Net fences at other sites such as Popham could further expand and stabilize Maine's Least Tern population. Although the maintenance needs for the electric fencing make it not feasible at all sites, and plover and tern chicks are still vulnerable to predation as they do not remain in the fenced areas, it is a valuable tool.

Outreach

With 62 nesting pairs and many plovers nesting at sites like Old Orchard Beach which have multiple beach access points that make it difficult for tabling, we focused much of our outreach efforts on interacting with the public as we were doing monitoring and management on the beach. Our efforts paid off as we engaged with almost 16,000 people in 2015.

Outreach with tables was concentrated on beaches where plovers were nesting, with more visits made to public than private beaches. We reached the greatest number of people through outreach efforts at Popham Beach State Park and Ogunquit Beach. The most typical and effective outreach method used was an educational table near beach entrances so people had to walk by the table as they accessed the beach. On beaches with no main entrance point (like Old Orchard Beach), outreach was conducted by one or two biologists setting up spotting scopes to engage beach-goers by showing them the birds. Some of our contact was made by social media posts, which are often of interest, but are not as effective as direct in person outreach.

We have found that at sites like Ogunquit that have had heavy outreach efforts in preceding years, the public is more informed and excited about the birds; people frequently remember talking with us on previous vacations. Based on our increasingly positive interactions, we believe our outreach efforts are productive and worth continuing.

Law Enforcement

The presence of wardens on the beach was helpful in ensuring compliance with staying outside our symbolic fencing and also with following dog ordinances. Wardens gave out warnings to dog owners, provided information about the birds to beach-goers, and were critical in investigations of incidents on the beaches. Continued and increased pressure from dog walkers on beaches such as Fortunes Rocks Beach, Hills Beach, Pine Point, and Higgins Beach makes Warden Service presence essential for continued plover success on Maine Beaches.

Beach Cleaning

Beach cleaning continues on many of Maine's beaches, although some beach managers are reducing cleaning activity. Beach cleaning needs to be done in accordance with a site specific management plan that incorporates the needs of nesting birds. Old Orchard Beaches and Pine Point Beach are regularly cleaned, and most sections of Ogunquit Beach are cleaned, although the "Natural Beach Area" continues

to be left untouched throughout the summer. Continued proper management of this beach will further build up the beach, making it an excellent example for other municipalities and beach managers. Large swaths of Old Orchard Beach were left unraked because of the several pairs of plovers nesting there. Time on the beach, education and the extremely helpful support of OOB Public Works helped make this a successful season. Use of trained spotters (in accordance with beach management agreements) should continue to be monitored and encouraged. In many cases, Public Works employees become essential on-the-ground allies of the birds and they are frequently the first to discover nests and report unusual activity.

Predator Management

Predator management from USDA Wildlife Services continues to be integral to Maine's Piping Plover and Least Tern populations. Wildlife Services operated at only four of our 26 sites, but two of these sites were locations where we had successful Least Tern colonies (the only additional successful colony was successful thanks to an electric net fence). Predator management areas increase nesting birds, decrease nest predation, and increase chick survivorship. We believe that productivity numbers would be much lower at Crescent Surf, Goosefare Brook, and Popham Beach State Park without this essential support from the Wildlife Services team. Wildlife Services conducts annual reports of their work, and the results consistently demonstrate the effectiveness of predator control.

Domestic and Feral Animals

Continued collaboration with the Warden Service and further outreach efforts are critical to limiting the detrimental effects of domestic and feral animals on nesting Piping Plovers. Roaming cats and dogs off leash present problems every year and result in nest abandonment and plover harassment. Continued education and monitoring of dog owners (particularly by the Warden Service) will be important to nesting success in future years, especially during early morning and evening hours, when walkers are most likely to let their dogs run on the beach.

Use of Trail Cameras

In 2015, motion-sensitive trail cameras were set up to try to identify predators at Ogunquit Beach and Goose Rocks Beach. We identified foraging crows on Ogunquit and did not capture any observations from Goose Rocks this year. Trail cameras continue to be useful in identifying problem predators at sites as needed, though they can be challenging.

Least Terns

Careful monitoring of nesting colonies, along with a consistent and prompt response to predator issues is necessary for these tern colonies to succeed. We recommended that the current predator monitoring and management programs continue, including use of the electric net fence at Crescent Surf, along with outreach to landowners. Additional electric net fences at other potential sites should be used in order to help disperse Maine's nesting Least Tern population across more beaches.

For 2016, we should continue to coordinate nest counts and improve our protocol for counting fledglings.

Table 1: Number of Nesting Least Tern Pairs and Fledglings ( ) at each Nesting Site in Maine, 1977-2015

	WELLS	LAUDHOLM FARM	CRESCENT SURF	GOOSE ROCKS	GOOSEFARE BROOK	PINE POINT	FERRY/ WESTERN BEACH	STRATTON ISLAND	HIGGINS	RAM ISLAND	SEAWALL	POPHAM	REID STATE PARK	TOTAL
1977	0(0)	[3(0)]	14(10)	20-25(20)	-	0(0)	6-8(6)	-	-	0(0)	13(14)	4-5(0)	0(0)	50-60(50)
1978	0(0)	0(0)	[7(0)]	55(35+)	-	0(0)	20(25+)	-	-	0(0)	18(6+)	0(0)	0(0)	93(66)
1979	25(6+)	3(?)	0(0)	[22(0)]	-	0(0)	30(12)	-	-	0(0)	20(13)	0(0)	0(0)	78(31)
1980	[2(0)]	[6(0)]	17(12)	15(12)	-	0(0)	6(0)	-	-	0(0)	12(4)	0(0)	12(6)	62(34)
1981	0(0)	[N3(0)] [S3(0)]	55(20)	6-15(0)	-	0(0)	0(0)	-	-	0(0)	E2(0) W2(0)	4(1)	15(0)	78(21)
1982	0(0)	0(0)	27(13)	0(0)	-	0(0)	0(0)	-	-	0(0)	E3(5) W4(2)	0(0)	5(6)	39(26)
1983	0(0)	0(0)	[9](0)	22(5)	-	0(0)	0(0)	-	-	0(0)	14(12)	10(5)	8(7+)	54(29)
1984	0(0)	0(0)	0(0)	39(15)	-	0(0)	0(0)	-	-	0(0)	40(52)	0(0)	9(15)	88(82)
1985	0(0)	0(0)	4(3)	57(6)	-	0(0)	0(0)	-	-	8(0)	36(3)	0(0)	26(0)	131(12)
1986	0(0)	0(0)	26(10)	25(1)	-	1(0)	0(0)	-	-	0(0)	72(18)	0(0)	0(0)	124(30)
1987	0(0)	0(0)	[20(0)]	19(2)	-	8(1)	0(0)	-	-	0(0)	48(3)	14(6)	[8(0)]	89(12)
1988	0(0)	0(?)	45(20+)	[12(1)]	-	0(0)	0(0)	-	-	0(0)	13(12)	40+(7+)	[12(0)]	98(40)
1989	0(0)	0(0)	46(0)	5(0)	-	0(0)	0(0)	-	-	0(0)	18(1)	15(1)*	6(6)	83(8)
1990	0(0)	0(0)	16(6)	3(0)	-	0(0)	0(0)	-	-	0(0)	18(2)	20(15)	8(21)	65(44)
1991	0(0)	1(1)	0(0)	9(0)	-	0(0)	0(0)	-	-	0(0)	0*(12)	30(6)	12(6)	52(25)
1992	0(0)	14(11)	15(42)	0(0)	-	0(0)	0(0)	-	-	0(0)	33(30)	0*(0)	32(40)	94(123)
1993	0(0)	1(3)	64(62)	1(0)	-	0(0)	0(0)	-	-	0(0)	29(22)	8(4)	22(23)	125(114)
1994	0(0)	12(13)	35(32)	0	-	0(0)	0	-	-	0	22(20)	0	20(14)	89(79)
1995	0	8(0)	25(9)	[10(0)]	-	0	0	-	-	0	25(0)	0	42(7)	100(16)
1996	0	0	[15(0)]	0	-	0	0	-	15(8)	0	[20(0)]	25(22)	[30(0)]	60(30)
1997	0	0	20(1)	0	-	0	0	-	15(10)	0	[4(0)]	15(0)	[16(0)]	50(11)
1998	0	1(2)	20(7)	10(0)	1(0)	0	0	-	[25(1)]	0	12(2)	0	35(0)	86(12)
1999	0	20(20)	40(45)	0	0	0	0	-	[9(1)][1]	0	[28(1)][1]	0	0	62(67)
2000	0	37(17)	85(62)	0	0	0	0	-	4(2)	0	0	0	0	126(81)
2001	0	15(#)	102(57)	0	0	0	0	-	4(6)[2]	0	3(0)[2]	0	0	120(63)
2002	0	12(√)	81(145)	0	0	0	0	-	9(8)	0	0	0	19(2)	121(155)
2003	0	20(0)	57(8)	8(0)	0	0	0	-	38(53)	0	0	0	33(5)	156(66)
2004	15(10)	1(0)	[50(3)]	0	0	0	0	-	45(54)	0	0	0	50(2)	146(69)
2005	0	4(1)	[52(7)]	0	0	0	[40(3)]	18(9)	[22(0)]	0	[17(0)]	0	0	114(20)
2006	[1(0)]	0	30(10)	[25(1)]	0	0	0	103(15)[4]	1(0)	0	0	0	[1(0)]	134(26)[5]
2007	1(1)	0	[37(1)]	[45(2)]	0	0	0	113(108)	0	0	0	0	0	150(112)[6]
2008	0	0	30(10)	2(0)	0	0	[2]	72(33)	0	0	0	0	0	166(89)[7]
2009	0	0	102(62)	[6(0)]	0	0	0	72(16)	[16(0)]	0	0	0	0	170(78)
2010	0	0	136(22)	18 (0)[8]	0	0	0	76(3)	0	0	0	0	0	212(25)
2011	0	0	123(73)	23 (12)	0	0	0	59(28)	0	0	0	0	0	205(113)
2012	0	0	99(79)	0	0	0	0	92(72)	0	5(1)[9]	0	2(3)[9]	0	191(155)[10]
2013	0	0	129(93)	0	0	0	0	92(79)	0	0	0	3(0)	0	224(172)
2014	0	0/*4* (4)	164(29)	0	0	0	0	79/*99* (36)	4/*11* (0)	0	0	2/7(6)	0	249(72)
2015	**0**	**0/6(0)**	**138+(144)**	**0**	**0**	**0**	**0**	**69/95(0)**	**25(13)**	**0**	**0**	**1/14(4)**	**0**	**233(161)**

[ ] colony deserted

italicized numbers are high counts at each site

* colony moved from Popham to Seawall after census

total amount of fledglings included with the Crescent Surf totals, could not differentiate totals between the beaches

√ Laudholm fledglings combined with Crescent Surf

[1] only nesting pairs counted in total

[2] renesting after loss at Crescent Surf/Laudholm not counted in total - Higgins(1pr), Seawall(3pr)

[3] renested from colony at Crescent Surf after crow predated nests

[4] preliminary numbers

[5] total was simultaneous count at Stratton, Higgins and Crescent Surf, when majority of birds appeared to be nesting after other sites abandoned

[6] total was simultaneous count at Stratton, Goose Rocks, Crescent Surf, and Wells, when majority of birds appeared to be nesting

[7] total was simultanious count at Strattton, Goose Rocks, Crescent Surf, and Western, when majority of birds appeared to be nesting

[8] renested from colony at Crescent Surf after fox predation, not counted in total

[9] Ram Island and Popham colonies developed after the storm and census, renests from Stratton and Crescent Surf

[10] 185 was GOMSWG census, 191 pairs is closer to actual number, though still an underestimate due to storm event.

Table 2: Productivity of Least Terns in Maine, 1977-2015

Year	Chicks Fledged/Pair	Productivity
1977	50/55	0.9
1978	66/93	0.7
1979	31/78	0.39
1980	34/62	0.54
1981	21/78	0.26
1982	26/39	0.66
1983	29/54	0.53
1984	82/88	0.93
1985	12/131	0.08
1986	30/124	0.24
1987	12/89	0.13
1988	40/98	0.4
1989	8/83	0.09
1990	44/65	0.68
1991	25/52	0.48
1992	123/94	1.31
1993	114/125	0.91
1994	79/89	0.89
1995	16/100	0.16
1996	30/60	0.5
1997	11/50	0.22
1998	12/86	0.14
1999	67/62	1.08
2000	81/126	0.64
2001	63/120	0.53
2002	155/121	1.28
2003	66/156	0.42
2004	69/146	0.47
2005	20/114	0.18
2006	26/134	0.19
2007	112/150	0.75
2008	89/166	0.54
2009	78/170	0.46
2010	25/212	0.12
2011	113/205	0.55
2012	155/191*	0.81
2013	172/224	0.77
2014	72/249	0.29
2015	**161/233**	**0.69**

*GOMSWG census window estimate is 185, washovers disrupted counts and this estimate is not reflective of population

Table 3: Productivity of Piping Plovers in Maine, 1981-2015

Year	Chicks fledged/pair	Productivity
1981	9/10	0.9
1982	18/10	1.8
1983	7/6	1.17
1984	21/9	2.33
1985	28/15	1.87
1986	31/15	2.07
1987	21/12	1.75
1988	15/20	0.75
1989	38/16	2.38
1990	26/17	1.53
1991	45/18	2.5
1992	49/24	2.04
1993	76/32	2.38
1994	70/35	2
1995	95/40	2.38
1996	98/60	1.63
1997	93/47	1.98
1998	88/60	1.47
1999	91/56	1.63
2000	80/50	1.6
2001	109/55	1.98
2002	91/66	1.38
2003	78/61	1.28
2004	80/55	1.45
2005	27/49	0.55
2006	54/40	1.35
2007	37/35	1.06
2008	42/24	1.75
2009	46/27	1.70
2010	49/30	1.63
2011	70/33	2.12
2012	64/42	1.52
2013	85/44	1.93
2014	97/50	1.94
2015	**121/62**	**1.95**

Table 4: Number of Nesting Piping Plover Pairs and Fledglings( ) at each site in Maine, 1981-2015

	OGUNQUIT	MOODY	WELLS	DRAKES ISLAND	LAUDHOLM FARM	CRESCENT SURF	PARSONS BEACH	MARSHALL POINT	GOOSE ROCKS	FORTUNES ROCK	HILLS BEACH	FERRY	GOOSEFARE BROOK	OLD ORCHARD	PINE POINT	WESTERN	SCARBOROUGH	HIGGINS	RAM ISLAND	CRESCENT	HEAD BEACH	SEAWALL	POPHAM	HUNNEWELL	INDIAN POINT	REID STATE PARK	TOTAL
1981	0	0	1(0)	-	-	4(9)	-	0(0)	1(0)	-		-	-	-	1(0)	-	-	-	-	-		2(0)	0(0)	-	-	1(0)	**10(9)**
1982	0	0	0	-	-	3(10)	-	0	0	-		-	-	-	1(0)	-	-	-	-	-		5(8)	3(0)	-	-	1(0)	**10(18)**
1983	0	0	0	-	-	1(0)	-	0	0	-		-	-	-	0	-	-	-	-	-		3(4)	1(0)	-	-	1(3)	**6(7)**
1984	0	0	0	-	-	0	-	0	0	-		-	-	-	0	-	-	-	-	-		6(14)	1(2)	-	-	2(5)	**9(21)**
1985	1(3)	0	0	-	-	1(0)	-	1(2)	1(3)	-		-	-	-	0	-	-	-	-	-		9(14)	0	-	-	2(6)	**15(28)**
1986	1(1)	0	0	-	0	1(0)	-	0	1(4)	-		-	-	-	0	0	-	-	0	-		9(24)	0	0	-	3(2)	**15(31)**
1987	[1(0)]	0	0	-	0	1(0)	-	0	1(4)	-		-	-	-	1(0)	0	-	-	0	-		8(17)	0	0	-	1(0)	**12(21)**
1988	[1(0)]	0	0	-	0	1(2)	-	0	2(3)	-		-	-	-	0	0	-	-	0	-		7(3)	1(3)	6(2)	-	3(0)	**20(15)**
1989	0	0	0	-	0	2(3)	-	0	2(8)	-		-	-	-	0	0	-	-	0	-		7(11)	3(11)	1(3)	-	1(2)	**16(38)**
1990	0	0	0	-	0	3(4)	-	0	2(4)	-		-	-	-	0	0	-	-	0	-		6(8)	3(2)	1(4)	-	2(4)	**17(26)**
1991	0	0	0	-	1(3)	3(9)	-	0	1(3)	-		-	-	-	1(0)	-	-	-	-	-		4(12)	4(6)	2(6)	-	2(6)	**18(45)**
1992	0	0	0	-	1(0)	4(16)	-	0	2(3)	-		-	-	-	0	1(2)	-	-	-	-		7(13)	5(10)	2(0)	-	2(5)	**24(49)**
1993	0	0	0	-	1(4)	4(16)	-	0	2(7)	-		-	1(2)	-	0	3(9)	-	2(2)	1(3)	-		6(10)	8(18)	1(0)	-	3(5)	**32(76)**
1994	0	0	0	-	1(3)	4(11)	-	0	4(10)	-		-	1(3)	0	2(1)	3(8)	-	2(2)	1(1)	-		5(6)	7(19)	1(0)	-	4(6)	**35(70)**
1995	2(5)	0	2(5)	-	1(2)*	4(9)	-	0	6(15)	1(2)		-	1(0)	0	[1(0)]	3(10)	1(3)	2(4)*	2(5)	-		6(12)	4(12)	0	-	5(11)	**40(95)**
1996	5(10)	0	4(12)	1(0)	1(4)	5(15)	-	1(3)	6(8)	2(3)*			1(2)	1(3)	3(0)	3(4)	2(0)	5(13)	1(3)	-		7(6)	5(10)*	0	-	7(2)	**60(98)**
1997	3(8)	0	4(11)	-	1(2)	4(13)	-	1(3)	6(13)	2(4)		-	1(0)	2(0)	1(0)	[1(0)]	2(1)	4(13)	1(4)	-		5(9)	6(11)	-	[1(0)]	4(1)	**47(93)**
1998	6(16)	0	4(5)	1(0)	2(3)	3(6)	-	1(0)	7(14)	3(10)		-	1(1)	0(0)	1(0)	1(2)	3(2)	4(3)	2(4)	1(1)		9(10)	5(6)	2(2)	0	4(3)	**60(88)**
1999	6(5)	1(2)	6(9)	0	4(11)	4(4)	-	0(0)	6(12)	4(7)		1(1)	0(0)	0(0)	0(0)	0(0)	2(4)	3(10)	3(6)	1(1)		8(10)	2(3)	3(3)	0	2(3)	**56(91)**
2000	4(4)	0	5(10)	0	6(14)	3(6)	1(4)	0	5(1)	3(3)		0	1(4)	0	0	0	3(8)	2(7)	2(7)	1(0)		9(7)	0	2(1)	0	3(4)	**50(80)**
2001	3(1)	0	6(19)	0	4(14)	5(14)^	1(4)	0	4(11)	4(0)		0	1(1)	1(2)	1(0)	0	3(6)	4(9)	4(5)	0		10(8)	[1(0)]	1(4)	1(3)	4(8)^	**55(109)**
2002	5(0)	0(0)	7(10)	1(0)	5(15)	5(6)	2(7)	0(0)	4(9)	3(1)	1(1)	0(0)	1(1)	1(1)	4(1)	0(0)	4(4)	4(11)	4(5)	1(1)	1(0)	6(9)	1(0)	0(0)	0(0)	6(9)	**66(91)**
2003	3(1)	0(0)	5(12)	1(1)	6(10)	8(0)	3(6)	0(0)	4(5)	1(2)	1(0)	0(0)	1(4)	1(1)	2(2)	0(0)	3(1)	5(10)	3(1)	1(0)	0(0)	5(3)	1(0)	0(0)	0(0)	7(19)	**61(78)**
2004	3(4)	0(0)	7(21)	1(0)	5(3)	3(4)	2(3)	0(0)	4(0)	1(3)	1(2)	0(0)	1(1)	1(2)	1(0)	0(0)	2(1)	6(10)	3(5)	1(0)	0(0)	5(7)	1(1)	0(0)	0(0)	7(13)	**55(80)**
2005	4(0)	0	6(6)	1(0)	1(1)	6(5)	1(0)^	0	1(1)	1(0)	2(1)	0	1(2)	1(0)	0	2(1)	2(6)	6(0)	4(1)	0	0	5(0)	1(0)^	0	0	6(3)	**49(27)**
2006	1(0)	1(2)	4(9)	1(2)	0	5(4)	0	0	5(14)	0	2(1)	1(0)	1(1)	1(1)	0	2(0)	3(6)	3(2)	2(3)	0	0	5(4)	1(2)	0	0	3(3)	**41 (54)**
2007	3(1)	0	2(2)	1(1)	0	4(4)	0	0	7(10)	0	1(0)	2(0)	1(0)	1(2)	0	2(6)	2(0)	2(3)	1(1)	0	0	2(0)	1(0)	0	0	3(7)	**35 (37)**
2008	0	0	2(6)	0	0	3(9)	1(1)	0	7(15)	0	0	0(0)	2(3)	1(0)	0	1(4)	1(0)	1(0)^	3(3)	0	0	0	0	0	0	2(1)	**24(42)**
2009	1(3)	0	2(3)	0	0	6(19)	0	0	8(15)	0	0	0	1(3)	1(0)^	0	1(0)	1(0)^	2(0)	2(2)	0	0	2(0)*	0	0	0	2(1)*	**27 (46)**
2010	2(2)	0	3(6)	0	0	6(14)	0	0	8(10)	2(6)	0	0	1(3)	0	0	1(0)	0	1(2)	2(0)	0	0	0	2(2)	0	0	2(4)	**30(49)**
2011	3(5)	0	4(7)	0	0	5(14)	1(4)	0	7(18)	2(3)	1(0)[1]	0	1(4)	0	1(1)	0	1(0)	2(1)	1(3)	0	0	1(4)	3^(6)	0	0	1(0)	**33(70)**
2012	2(4)	1(2)	4(8)	0	0	7(17)	0	0	9(10)	1(2)	1(0)	0	1(3)	0	1(1)	0	0	1(0)	1(1)	0	0	2(0)	6(13)	0	0	2(3)	**42(64)**
2013	3(4)	0	3(7)	0	1(4)	7(22)	0	0	6(11)	3(4)	2(2)[1]	0	2(4)	2(5)	1(0)	0	2(3)	1(0)^	2(2)	0	0	1(4)	7(7)	0	0	2(6)	**44(85)**
2014	3(7)	1(1)	3(7)	0	1(1)	6(18)	0	0	4(9)	2(6)	0	1(0)	2(2)	6(10)	3(5)	0	5(0)^	1(3)	2(0)	2(4)	0	2(4)	5(14)	0	0	2(6)	**50(97)**
2015	**5(8)**	**1(2)**	**5(8)**	**1(3)**	**1(4)**	**7(18)**	**0**	**0**	**5(10)**	**3(5)**	**1(0)**	**0**	**1(2)**	**9(17)**	**2(3)**	**2(6)**	**1(3)**	**3(4)**	**1(2)**	**1(2)**	**0**	**6(14)**	**5(10)**	**0**	**0**	**2(0)**	**62(121)**

[1] = Chick raised in rehabilitation center and released, not counted in total fledgling count
[ ] = failed early in season, not counted in total
* = additional nests present but failed
^ = 1 pair moved to another site, not counted in total

Table 5: Causes of Nest Losses for Piping Plovers, 2002-2015

Cause of Loss	Number of Nests Lost													
	2002	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Tide	18	6	12	22	2	15	0	6	1	0	21	14	4	6
Nest Predation	21	19	4	17	9	5	2	3	1	2	9	14	5	11
Abandonment	17	9	21	13	6	9	4	3	5	7*	6**	5**	6	4
Buried in Sand	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Other (unknown)	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Totals	**56**	**34**	**37**	**52**	**17**	**31**	**6**	**12**	**7**	**9**	**36**	**33**	**15**	**22**

*Does not include the abandonment of a nest during hatching, **one abandonment due to dead egg

Table 6: Number of Nests Hatched, Destroyed and Abandoned in Exclosed vs. Unexclosed Piping Plover Nests in 2015

Nesting Outcome	Unexclosed	Exclosed (Blueberry netting top)	Total
Destroyed			
Avian Predator	5	0	5
Mammalian Predator	2	0	2
Unknown Predator	4	0	4
Tide	2	5	7
Abandoned	2	2	4
Unsuccessful Nests SUBTOTALS	***15***	***7***	***22***
Successfully hatched	***19***	***34***	***53***
Total Nesting Attempts	***34***	***41***	***75***

Table 7: Estimated Piping Plover Productivity Loss from Egg to Fledgling, 2002-2015

Year[1]	% Egg Hatchability[2]	% Chicks Fledged[3]	Productivity[4]
2002	39%	73%	1.40
2003	48%	57%	1.28
2004	42%	66%	1.45
2005	34%	26%	0.55
2006	54%	53%	1.35
2007	35%	53%	1.06
2008	74%	49%	1.75
2009	57%	68%	1.70
2010	74%	51%	1.63
2011	69%	65%	2.12
2012	45%	57%	1.52
2013	46%	77%	1.93
2014	63%	70%	1.94
2015	**69%**	**61%**	**1.95**

[1]These years have the most detailed information regarding egg and chick numbers.
[2]Number of eggs hatched/Total eggs observed
[3]Number of chicks fledged/Total eggs known to have hatched
[4]Chicks fledged/Total pairs

Table 8. List of Regularly Monitored Beaches and Observed Piping Plover Activity in 2015

Town	*Beach*	*Activity- X indicates plovers observed*
Ogunquit	Ogunquit	X
Wells	Moody	X
	Wells	X
	Drakes Island	X
	Laudholm Farm	X
Kennebunk	Parsons Beach	X
	Rachel Carson easement	X
Kennebunkport	Marshall Point	X
	Goose Rocks	X
Biddeford	Fortunes Rocks	X
	Hattie's	X
	Hills	X
Saco	Ferry	X
	Goosefare Brook	X
Old Orchard Beach	Ocean Park	X
	Old Orchard	X
Scarborough	Pine Point	X
	Ferry/Western	X
	Scarborough	X
	Higgins	X
Cape Elizabeth	Ram Island	X
	Crescent Beach State Park	X
Phippsburg	Hermit Island (Head Beach)	O
	Seawall	X
	Popham State Park	X
	Hunnewell	O
Georgetown	Indian Point	O
	Reid State Park	X

Appendix I

PIPL Behavior and Predator Observations **Year: 2015**

Beach Name: **Observed by:**

Area or Nest # Observed	Date & Time	Tide	Visibility H, M, or L see below	# PIPL Adult, Chick or Fledgling	PIPL Paired or Unpaired P or U	Activity of PIPL (see codes below)	Predator Sign within 10 meters of nest or colony (see codes below)	Comments: Details about management, predators, disturbance, other

Visibility (due to haze, rain, or fog): H=not impaired, M=portions of beach not visible, L=can not survey area adequately

Activity Codes: 1=feeding, 2=rest/preening, 3=moving around, 4=pipl pipl aggression, 5=pipl other aggression. 6=nest scrapes, 7=false incubation, 8=feigning, 9=react to observer. 10=flying, 11=incubating

Predator Codes: H=human (record details on person), D=dog (record details), F=fox, S=skunk, G=gull. C=crow. FT=flood tide, ST=storm tide, O=other (describe)

LETE Flock Estimate and Colony Observations

Beach Name: **Year: 2015**

Date & Time	Area Observed:	Visibility	#LETE	Activitiy	Predator Sign	Electric Fence Charge	Comments:

Visibility(due to haze, rain or fog): H=not impaired, m=portions of beach not visible, L=cannot survey area adequately

Activity Codes: 1=feeding, 2=rest, 3=moving around, 4=LETE LETE aggression, 5=LETE other aggression, 6= nest scrapes, 7=false incubation, 8=feigning, 9=react to observer, 10=flying, 11= incubate

Predator Codes: H=human (record details on person, D=dog(record details), F=fox, s=shunk, G=gull, FT=flood tide, ST= Storm Tide 0=other (describe)

 # LETE Codes: A= Adult, F= Fledgling, C=Chick

Data Sheet ___

Piping Plover Nest Record

Beach:	Nest Number:	Comments- renest?
Date and time Found:	Location Description:	
Location- GPS:		
# eggs when found:	Dates for eggs 2#	#3 / #4
Exclosure Date (or details on why not exclosed)	Exclosing Time	Time for return to nest
Estimated Hatch:	Actual hatch date	# eggs hatched
Estimated Fledge Date:	# Fledged	Observed fledge
Failure Date:	Cause of failure	
Additional comments		

Landowner Name, Date	Details

Nest Checks

Date	Time	Initials	# eggs or chicks	# adults	Comments e.g., Predator activity? Dogs? Behavior? bands?

Nest #

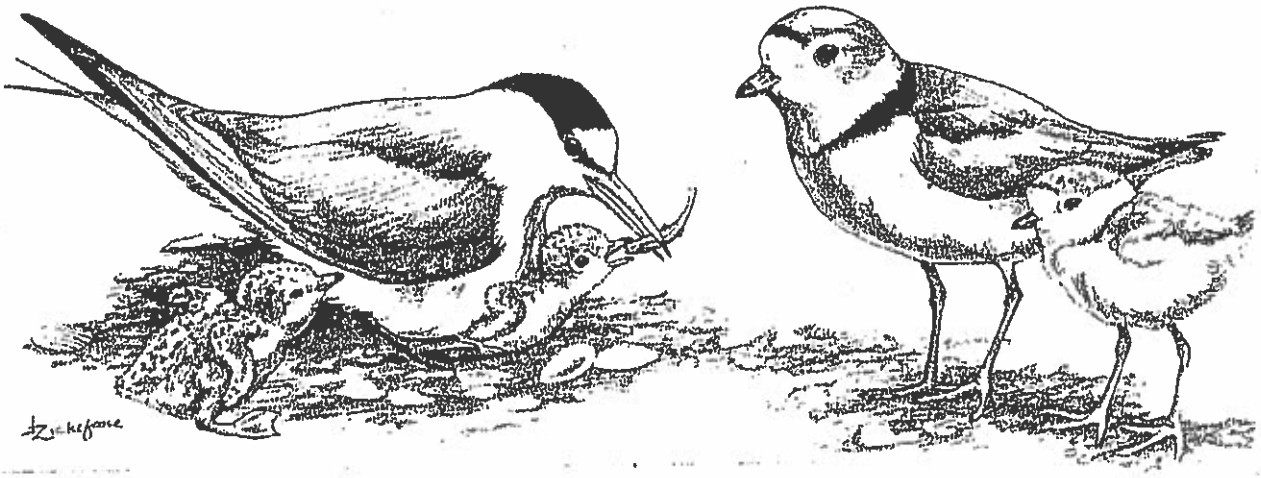
2015 Piping Plover Census

Town	Beach	# Adults	# Pairs	# Nests	# Chicks
Biddeford	Fortune's Rock Beach	5	2	3	5
	Granite Pt Beach	0	0	0	0
	Hattie's Beach	0	0	0	0
	Hills Beach	2	0	1	0
Cape Elizabeth	Crescent Beach State Park	3	1	0	0
	Ram Island	0	0	0	0
Georgetown	Indian Point	0	0	0	0
	Reid State Park	4	2	2	0
Kennebunk	Crescent Surf	15	8	7	9
	Colony Beach	0	0	0	0
	Gooch's Beach	0	0	0	0
	Kennebunk Beach	0	0	0	0
	Parsons Beach	1	1	0	0
Kennebunkport	Goose Rocks Beach	8	4	5	6
	Marshall Point	0	0	0	0
Kittery	Crescent Beach	0	0	0	0
	Seapoint Beach	0	0	0	0
Ogunquit	Ogunquit Beach	10	5	4	3
Old Orchard Beach	Ocean Park	1	0	1	0
	Old Orchard Beach-N	17	9		
	Old Orchard Beach-S	0	0	0	0
Phippsburg	Head Beach	0	0	0	0
	Hunnewell Beach	0	0	0	0
	Popham Beach State Park	10	5	4	0
	Seawall Beach		5	5	
Saco	Ferry Beach	1	0	0	0
	Goosefare Brook	2	1	1	0
Scarborough	Higgins Beach	6	3	3	0
	Pine Point		2		
	Scarborough Beach	2	1	1	0
	Western/Ferry Beach	4	2	2	0
Wells	Drake's Island	1	1	1	0
	Laudholm Farm	3	2	1	0
	Moody Beach	3	1	0	3
	Wells Beach	8	4	1	5
York	Cape Neddick Beach	0	0	0	0

TOTAL		59	42	31
Adjusted total (max concurrent pairs)		*62*		

RESTRICTED AREA

This area is a natural breeding ground for Terns and Plovers



THESE RARE BIRDS, THEIR NESTS AND EGGS ARE PROTECTED

UNDER MAINE AND FEDERAL LAWS

Persons May Be Arrested and Fined for Killing, Harassing or in Any Way Disturbing Birds Nesting in This Area (12 MRSA Sec. 7756).

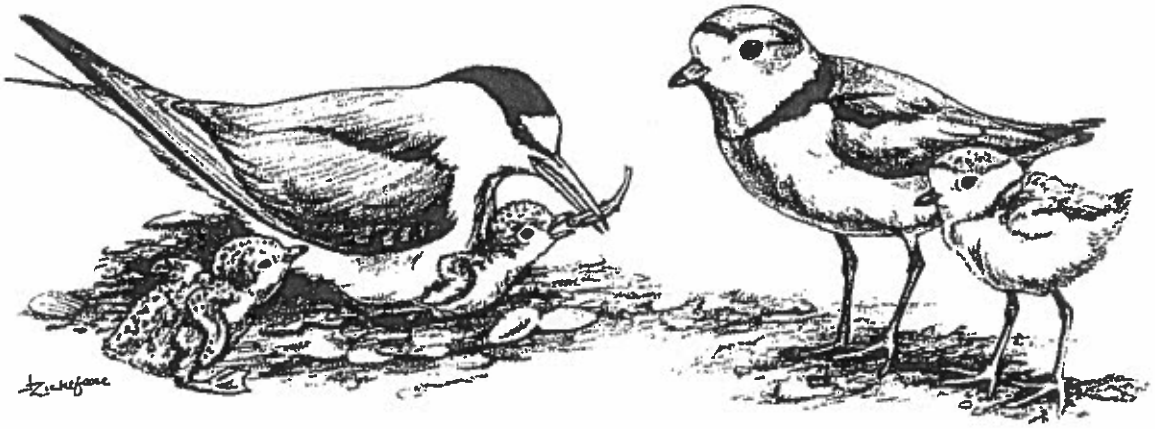
ILLUSTRATION BY JULIE BICKEFORDE, HADLYME, CT. 06439

Appendix IV

VOSS SIGNS MANUFACTURING, INC. 13104-7553 (315) 682-6418

ZONE RESTREINTE

Cette zone est un terrain de reproduction pour les Hirondelles De Mer et les Pluviers Siffleur



CES OISEAUX RARES, LEURS NIDS ET LEURS OEUFS SONT PROTÉGÉS

PAR LES LOIS DU MAINE ET LES LOIS FÉDÉRALES
Sera Arrêtée et Condamnée à L'amende
Toute Personne Trouvée Coupable D'avoir Tué, Harcelé
Ou Troublé de Quelque Façon Que ce Soit
Les Oiseaux Qui Font Leurs Nids Dans Cette Zone.

ILLUSTRATION BY JULIE ZICKEFOOSE, HADLYME, CT 06439

VOSS SIGNS, MANLIUS, NY 13104-0553 (315) 682-6418

Appendix V

PIPL Exclosure Raising & GPS Data **Observer:** **Year: 2015** **Species: PIPL**

Date / Time	Weather [1]	Beach Name	Nest #	# Eggs	Begin Time Exclosing	End Time Exclosing	Total Time	GPS in UTMS (Zone 19N NAD 83)	Comments [2] (e.g. behavior, nest return)

1 Include windspeed and temp

2 In comments note if incubating (I) or not incubating (not I).

Piping Plover & Least Tern Project

Newsletter 2015

MAINE AUDUBON

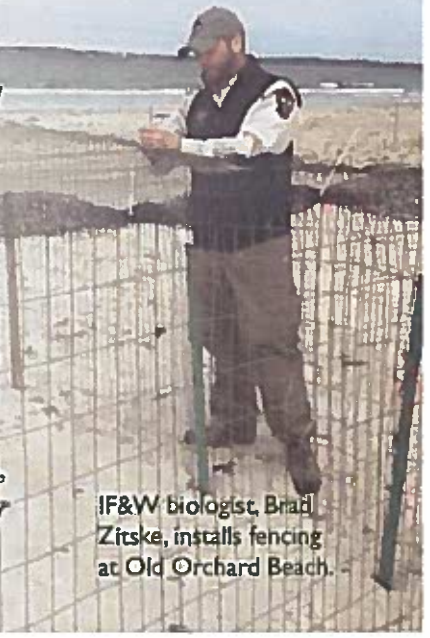
A Record Year for Fledged Plovers

Laura Zitske, Plover Project Director

Working to protect beach-nesting endangered species is a practice in balancing optimism and realism. We work hard to protect plovers and terns because we believe that our efforts can make a difference, but we also know that many things are out of our control and sometimes we need to change expectations.

As the 2015 nesting season progressed and it became apparent that the number of nesting plover adults would be higher than I had anticipated (24% increase over last year), I braced myself for low productivity. Our two crews could not keep up with the birds. We had plovers scattered across beaches where they typically do not nest (such as Drakes Island), and high numbers on busy beaches, including nine pairs nesting on Old Orchard Beach. Thankfully, biologists were far from the only people looking out for wildlife on the beach. Volunteers, tourists, public works staff, lifeguards and others spent hours on the beaches monitoring the birds and educating the public. Thanks to the efforts of countless individuals and a dash of good luck, Maine plovers had a stellar year. 62 Piping Plover pairs nested on Maine beaches, the second highest number we have seen since monitoring began in 1981. In even better news, 121 plover chicks fledged (flew) off Maine beaches in 2015, a whopping dozen more than our second highest fledgling count in 2005.

A highlight of this year was a big plover showing on Phippsburg beaches, including an exciting and very rare observation of a Great Lakes Plover nesting on Seawall Beach. We had plovers nesting at 20 sites (21 if you separate Ocean Park from Old Orchard Beach) — two more sites than last year and a tie for the most nesting sites we have seen since monitoring began. (*For details on how birds fared on each beach, please refer to the table on page 6.*) The dispersed nesting is good news as we don't like to have most of our eggs in one basket — or beach! It kept crews busy and made us extremely grateful for the strong support from volunteer monitors, towns, state parks and community stakeholders.



IF&W biologist, Brad Zitske, installs fencing at Old Orchard Beach.

2015 A Mixed Bag for Least Terns

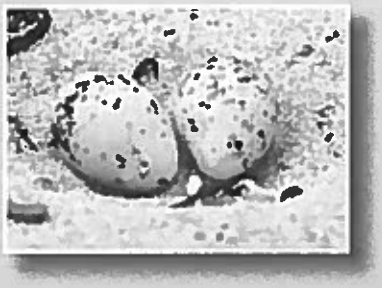
Success for Least Terns was very site-specific in 2015. All colonies started out well, with terns returning to beaches in Kennebunk, Scarborough, Wells, Phippsburg and Stratton Island. In total, at least 233 pairs of least terns fledged a minimum of 161 chicks in 2015.

Least Terns on a private beach in Kennebunk had incredible success this year thanks to a partnership between private landowners and Rachel Carson National Wildlife Refuge. 138 nests were counted early in the season, although this is likely a low estimate of Least Tern numbers as there were too many Piping Plover chicks running around to safely coordinate a second count. Ultimately, at least 144 fledgling Least Terns were counted at this Kennebunk beach, resulting in the highest recorded productivity in over a decade.

Popham Beach, monitored by Maine Audubon, raised 4 fledglings from 14 nests. This is the third straight year that terns have nested at Popham and hopefully signals a revival of this nesting colony. (*For details on the success of Higgins Beach in Scarborough see page 4.*)

The Stratton Island colony, monitored by National Audubon's Seabird Restoration Program, did not have the same success. The colony had 69 pairs early in the season, but heavy predation by Black-crowned Night Herons resulted in zero chicks fledging from this colony. Laudholm Beach in Kennebunk also experienced complete colony failure: a nocturnal predator — likely a raccoon — destroyed all 6 nests at this beach.

Despite some location-specific losses, overall productivity was similar to or better than that of previous years and signals our conservation efforts are paying off. Continuing to minimize predation will be a key factor in boosting Least Tern population growth in the state of Maine.



Tern eggs camouflage very well in the sand. Though similar to Plover eggs, they look more "splotchy" than "speckled."

Electric Fencing Benefits Terns

Over the last few years, Least Terns have attempted to nest on Popham Beach State Park and Higgins Beach in Scarborough. Both sites have been vulnerable to predation issues and most of their nests were lost. Popham was able to fledge 8 chicks in 2013 and 2014 combined. This year we were excited to see increased numbers of nesting birds at both beaches. Popham had a high count of 14 nests and fledged at least four birds.

This year Maine Audubon and Maine Department of Inland Fisheries and Wildlife acquired electric fencing for Higgins Beach. In 2014, a fox destroyed the few nests present. This year's fencing, coupled with the hard work of biologists, game wardens and volunteers, gave Higgins the first Least Tern fledglings in over 10 years. Higgins had a high count of 19 nests and fledged at least 13 birds.

With luck and hard work, these trends should continue on both beaches, as Least Terns will often return to areas where they successfully nested.

Least Terns were the first endangered animal listed in the state of Maine. They have struggled through the years against declining populations, disappearing habitat and the constant threat of predation. They have nested on only a handful of known locations in the state. When a bird uses only a few spots as nesting grounds, their population is subject to greater threat than if they were spread out. Any damage that is done to a single area has a larger effect on that population. This year, with the Stratton Island colony failing completely, some of those birds ended up on Higgins Beach and were able to successfully re-nest.

From our Intern

Zac Fait

After working for so long in the service industry, I thought I was done putting up with the demands of clientele. Then I began my internship at Maine Audubon. Having considered the beach home far longer than humans have, the Piping Plovers throughout Maine have been a pleasure to serve. Making their summer stays here a bit safer and more comfortable is a worthy cause with many challenges, but also with many rewards. Experiencing first-hand how the efforts of biologists, volunteers, land owners and public officials directly secure a future for this species seems like nothing short of a miracle. Piping Plovers have significant personality, determination and chutzpah. These qualities are what make them such special birds, and give them the resilience they need in today's changing world.

From Our Other Beaches

Higgins Beach

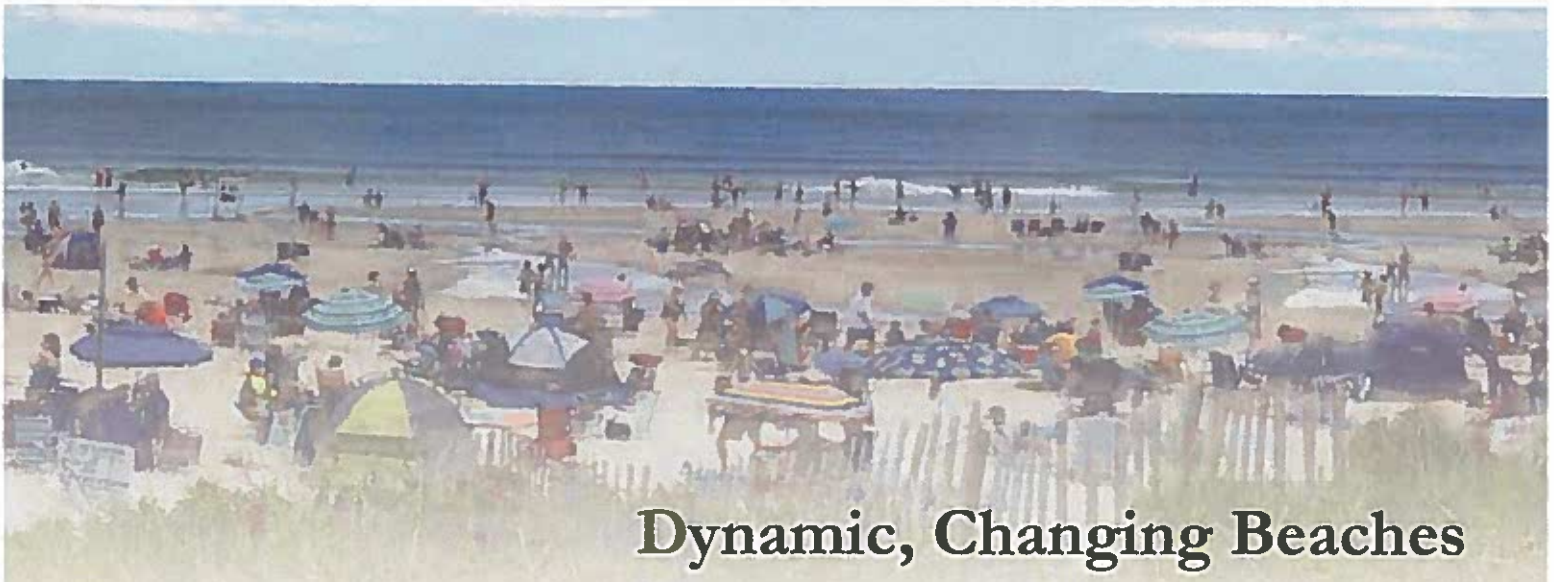
Higgins Beach in Scarborough is a small, but popular beach that draws in locals and tourists alike. Higgins is also home to tireless volunteers monitoring Piping Plovers and Least Terns. Higgins resident, Glennis Chabot, has been mobilizing volunteers on Higgins for several years, and with the support of the Town's Beach Monitoring Coordinator, Ryan Wynne, volunteer efforts have increased. In 2015, 25 volunteers devoted over 600 hours monitoring the plovers, terns and other coastal birds on Higgins Beach. They inform beach-goers about beach rules and the plight of the birds. The volunteer efforts are one of the driving forces behind the success of our coastal birds at Higgins Beach the last few years. This year, MDIFW and Maine Audubon erected an electric net fence on MDIFW property around the developing Least Tern colony, which further helped protect vulnerable nests and chicks from predators. Net fences can be an effective tool to help tern colonies succeed, though they require regular attention and more frequent visits than Maine Audubon can conduct. Thanks to the fence and consistent monitoring of the volunteers, Higgins fledged its first Least Tern chicks in a decade.

Old Orchard Beach

Old Orchard continues to impress biologists with its successful breeding of Piping Plovers on its busy beaches. This year, a record-setting nine pairs of plovers nested on Old Orchard Beach, more than any other beach in Maine. These nine pairs fledged a whopping 17 chicks — the second highest fledgling numbers of any beach this year! Plover success would not be possible without the help of a stellar Public Works department and a committed and caring community. From the condo dwellers that would holler down to people getting too close to fencing to the tourists who turn their back to the ocean to watch plover chicks running in the dune grass, Old Orchard is full of pleasant surprises!

Western Beach

Western Beach in Scarborough has seen major change over recent decades. Jetties prevent new sand from migrating to Western from Old Orchard and Pine Point Beaches, and steady erosion and large storms have taken much sand from the beach. In 2004 a major dredge/ beach nourishment project dumped 85,000 cubic feet of sand on the beach. The sand provided nesting habitat for plovers for five years, but there was insufficient nesting habitat for plovers starting in 2009. By 2013, all the sand from the dredge was completely gone. An additional dredge was performed in 2014 and 2015, and more sand was deposited on Western Beach. Biologists predicted plovers would nest on Western Beach with the new sand after the dredges, and were proven correct both times with the return of plovers in 2005 and 2015. This summer, two pairs of plovers successfully fledged six chicks!



Dynamic, Changing Beaches

Piping Plovers and Least Terns are adapted to deal with the unique stresses of living in a harsh and rapidly changing environment. These birds deal with the regular disturbances caused by storms and tides in a number of interesting ways. If nests are lost, both species are able to re-nest several times. Least Terns will even relocate entire colonies within a breeding season if they find conditions to be unfavorable. Long life-spans, quick reproductive turnover and the ability to find new areas to nest help Piping Plovers and Least Terns cope with both catastrophic events (like major storms) and the constant, gradual change of beach erosion.

Beaches are inherently dynamic systems. They are shaped over many years by ocean currents and they can be shaped with shocking abruptness by wind and waves. It is one of the few environments we encounter that can look very different between visits.

Beaches form in the places where sand deposits get trapped, often near the mouths of rivers or between rocky headlands. Though temporarily trapped, sand still gradually moves in the general direction of prevailing winds and ocean currents. Complicated gyres of current are created by Maine's jagged coast and cause the unpredictable movement of sand.

Unlike the gradual change brought by currents, powerful storms can move massive amounts of sand in a single event. Entire sandspits and mature dune systems can be washed away in a storm. Here too, human changes to the shoreline can exacerbate natural damage. Seawalls, unlike natural sloping dunes, redirect the pounding of the waves instead of slowly diminishing their energy. This causes erosion on either side of the wall and below. Shoreline stabilization efforts like jetties or groins change the way sand moves. Sand pushed along by currents builds up on the "upstream" side of jetties and is rapidly eroded away on the "downstream" side.

Areas scoured by storms begin their recovery when wrack (seaweed and debris) begins to accumulate. Beach recovery can seem slow, especially when wrack is on the beach, but on the geologic time scale it is incredibly fast. Wrack serves several important purposes in beach recovery. It provides structure on which windblown sand accumulates, holds a seedbank of seashore plants and contains rich moisture-holding seaweed to fertilize new seedlings.

The first plants to take hold are hardy, fast growing broadleaf plants that are remarkably good at trapping sand. Over time and as the elevation rises, beach grass will begin to colonize and further accelerate the growth of the beach. With favorable conditions, full dune systems can form around these pioneering plants in the course of just a few summers.

Popham Beach Over the Years

Dynamic Beaches (continued)

Popham Beach shows Maine's most extreme example of the forces that shape beaches. The Morse River separates Popham beach from Seawall beach, and sandbars on the two beaches fluctuate with the changing course of the river.

In 2007, a major storm eroded a massive dune system and violently changed the course of the Morse River. Sand from Popham beach rapidly washed away, accumulated within a year on Seawall beach and formed an enormous new sandspit. The Morse River again changed course in 2010 and severed the sandspit from Seawall. In the intervening years, the sand has been pushed by wind and currents back towards Popham beach. In only a few years a mature dune system has formed with vegetated dunes as high as 10 feet. Seventeen acres of beach are now sitting in what had been water in 2006. This new part of Popham has become important plover and tern habitat.

Photo: sherrietucker.com

2015 Piping Plover Nesting Data

TOWN	Beach	Pairs	Nest Attempts	Fledglings
Ogunquit	Ogunquit	5	5	8
Wells	Moody	1	1	2
	Wells	5	6	8
	Drakes Isl.	1	1	3
	Laudholm Frm	1	1	4
Kennebunk	Parsons Beach	**	0	0
	Rachel Carson Easement	7	7	18
Kennebunkprt.	Marshall Pt.	**	0	0
	Goose Rocks	5	5	10
Biddeford	Fortunes Rocks	3	4	5
	Hattie's	**	0	0
	Hills	1	1	0
Saco	Ferry	**	0	0
	Goosefare Brook	1	1	2
Old Orchard Beach	Ocean Park	1	1	1
	Old Orchard	8	9	16
Scarborough	Pine Point	2	5	3
	Western/Ferry	2	3	6
	Scrb. St. Park	1	1	3
	Higgins	3	5	4
Cape Eliz.	Ram Island	1	2	2
	Crescent Bch State Park	1	2	2
Phippsburg	Hermit Isl.	0	0	0
	Seawall	6	7	14
	Popham State Park	5	5	10
	Hunnewell	0	0	0
Georgetown	Indian Point	0	0	0
	Reid State Park	2	3	0
Totals		62	75	121

** = Activity observed, but no nesting

Behind the Scenes

Our Staff

(Back row, l-r): Biologist Jordan Kramer, Intern Zac Fait; (Front row, l-r) Biologist Traczie Bellinger, Intern Samantha Stalder and Project Director, Laura Zitske.

About the Project

Maine Audubon has worked for over 30 years to restore Maine's Piping Plover and Least Tern populations with help from our partners, Maine Department of Inland Fisheries and Wildlife (MDIFW) and the U.S. Fish and Wildlife Service (USFWS); populations have increased substantially in that time. The project is funded by MDIFW, USFWS, with additional funding from the Phineas W. Sprague Memorial Foundation.

The Piping Plover and Least Tern Project newsletter is published annually by Maine Audubon in partnership with the Maine Department of Inland Fisheries & Wildlife and Rachel Carson National Wildlife Refuge.

About Maine Audubon

Maine Audubon's science-based approach to conservation, education and advocacy advances wildlife and wildlife habitat conservation in Maine. Our citizen science programs connect Maine people to engaging volunteer opportunities that make meaningful contributions to conservation research.

The largest Maine-based wildlife conservation organization, Maine Audubon has eight centers and wildlife sanctuaries and serves over 50,000 people annually, with 15,000 members and 2,000 volunteers.

Sometimes we are lucky enough to give other kinds of wildlife a helping hand! Jordan Kramer found this Eider duckling lost in the bushes and released it with a same-aged brood.

Maine Audubon
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(207) 781-2330
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maine.gov/ifw

U.S. Fish & Wildlife Service
Rachel Carson National Wildlife Refuge
321 Port Road
Wells, ME 04090
(207) 646-9226
fws.gov/northeast/rachelcarson

PIPL/LETE Project
By the Numbers
from the 2015 season

198 Piping Plover chicks hatched

47 Exclosures put up by USFWS and Maine Audubon to protect plover nests

43 Landowners in Maine had nesting Piping Plovers and Least Terns

2 Red Knots (newly listed as federally threatened) observed by Maine Audubon crew on Maine beaches

2049 Piping Plover chicks fledged in Maine since 1981

2419 Least Tern chicks fledged in Maine since 1977

450 Estimate for how many Least Tern eggs were laid in Maine

289 Piping Plover eggs laid in Maine

Attention Volunteers!

Please send in your hours to Laura Zitske (lzitske@maineaudubon.org; (207) 781-2330 ext 226.

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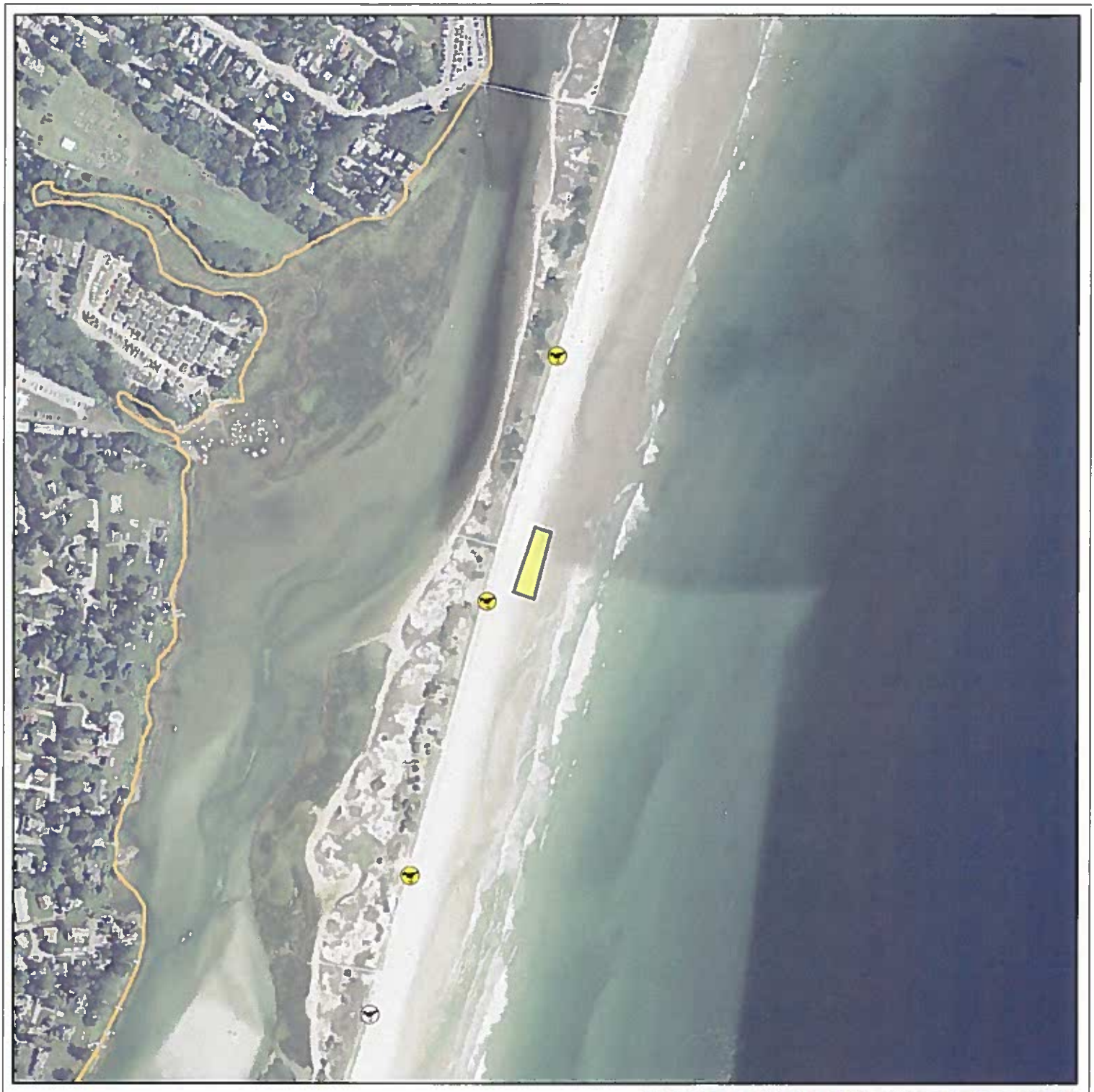
Appendix VII

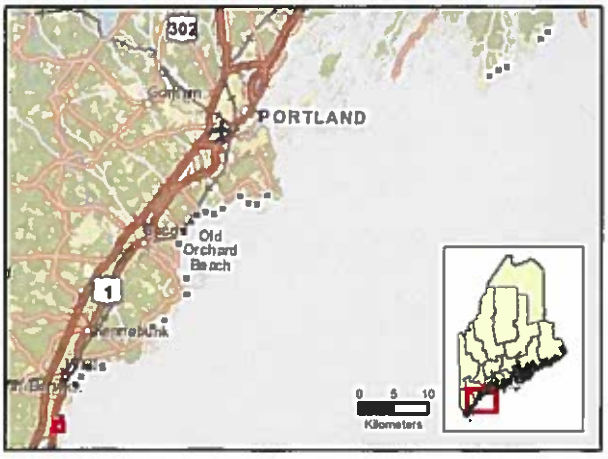
Beachname	# Pair	Nest #	Easting	Northing	Exclosed	# Eggs	Chicks	Fledgelings	Re-nest?	Fate	Approx. Date destroyed or hatched	Fledge Date
Crescent Surf	1	1	375671	4799554	Y	4	4	4	N	H	05/29/15	06/24/15
Crescent Surf	2	2	375390	4799375	Y	4	4	4	N	H	05/30/15	06/25/15
Crescent Surf	3	3	375290	4799247	Y	4	4	4	N	H	06/07/15	07/02/15
Crescent Surf	4	4	375343	4799258	Y	4	4	0	N	H	06/13/15	n/a
Crescent Surf	5	5	375115	4799202	Y	4	4	2	N	H	06/16/15	07/11/15
Crescent Surf	6	6	375152	4799185	N	4	4	2	N	H	06/16/15	07/11/15
Crescent Surf	7	7	375311	4799266	Y	4	4	2	N	H	06/18/15	07/14/15
Laudholm	1	1	374539	4800502	Y	4	4	4	N	H	06/09/15	07/04/15
Goosefare Brook	1	1	388051	4816814	Y	4	4	2	N	H	06/19/15	07/13/15
Crescent Beach SP	1	1	401071	4824248	N	4	4	2	N	H	06/26/15	07/21/15
Crescent Beach SP	2	2	400959	4824232	N	4	0	0	N	P	05/27/15	N/A
Drakes	1	1	374053	4797761	N	4	4	3	N	H	06/22/15	07/17/15
Fortunes Rocks	1	1	389168	4810060	N	4	4	1	N	H	05/28/15	06/29/15
Fortunes Rocks	2	2	389104	4809997	N	4	4	4	N	H	06/02/15	06/29/15
Fortunes Rocks	3	3	389028	4809911	N	4	4	0	N	H	07/03/15	
Fortunes Rocks	4	4	389179	4810057	Y	3	0	0	N	T	06/28/15	N/A
Goose Rocks	2	2	384331	4805075	Y	4	4	0	N	H	05/28/15	N/A
Goose Rocks	1	1	384457	4805144	Y	4	4	4	N	H	05/26/15	06/22/15
Goose Rocks	3	3	385987	4806278	Y	4	2	1	N	H	06/07/15	07/02/15
Goose Rocks	4	4	384336	4805039	Y	4	4	4	N	H	07/09/15	08/03/15
Goose Rocks	5	5	385653	4805985	Y	4	3	1	N	H	07/26/15	08/20/15
Higgins	1	1	397195	4824090	N	1	0	0	N	P	05/07/15	N/A
Higgins	1	1A	397205	4824043	Y	3	0	0	Y	T	05/17/15	N/A
Higgins	2	2	397149	4824057	Y	4	4	4	N	H	06/20/15	07/15/15
Higgins	1	1B	397209	4824075	N	4	0	0	Y	A	06/08/15	N/A
Higgins	3	3	397254	4824082	Y	4	0	0	N	T	07/03/15	N/A
Hills	1	1	388899	4812369	Y	4	0	0	N	A	06/09/15	N/A
Moody	1	1	371399	4792161	Y	4	3	2	N	H	06/05/15	06/30/15
Ocean Park	1	1	388366	4817675	N	3	3	1	Y	H	07/05/15	07/30/15
Ogunquit	1	1	371106	4791467	Y	4	4	3	N	H	06/05/15	06/30/15
Ogunquit	3	3	370723	4790190	N	4	0	0	N	P	06/13/15	N/A
Ogunquit	4	4	370936	4790942	N	4	4	0	N	H	07/04/15	
Ogunquit	5	5	370856	4790662	Y	4	4	4	N	H	07/06/15	07/31/15
Ogunquit	2	2	370769	4790349	N	4	4	1	N	H	06/16/15	07/11/15
OOB	1	1	390174	4820707	Y	4	3	1	N	H	06/03/15	06/29/15
OOB	2	2	389744	4820109	Y	4	3	2	N	H	06/05/15	06/29/15
OOB	3	3	389139	4819143	Y	4	4	3	N	H	06/09/15	07/04/15
OOB	4	4	389626	4819920	Y	4	3	3	N	H	06/05/15	06/29/15
OOB	5	5	390511	4821038	Y	4	4	4	N	H	06/11/15	07/06/15
OOB	6	6	389603	4819902	N	4	4	3	N	H	06/12/15	07/07/15
OOB	7	7	390599	4821107	N	4	0	0	N	T	05/17/15	N/A
OOB	8	8	388769	4818523	N	4	0	0	N	P	05/25/15	N/A
OOB	9	9	390048	4820556	Y	4	4	0	N	H	06/23/15	N/A
Pine Point	1	1	392634	4821740	N	4	0	0	N	P	05/13/15	N/A

Pine Point	2	2	390746	4821214	N	3	3	2	N	H	06/07/15	07/02/15
Pine Point	4	4	390697	4821163	N	4	0	0	Y	T	06/01/15	N/A
Pine Point	4	4A	390722	4821198	N	4	0	0	Y	P	06/08/15	N/A
Pine Point	3	3	391163	4821468	N	4	1	1	N	H	06/15/15	07/16/15
Popham	1	1	435504	4842646	N	4	4	3	N	H	06/14/15	07/07/15
Popham	2	2	435889	4842792	Y	4	4	4	N	H	06/19/15	07/14/15
Popham	3	3	435462	4842638	N	4	4	3	N	H	06/14/15	07/07/15
Popham	4	4	435373	4842594	N	4	4	0	N	H	06/16/15	N/A
Popham	5	5	435576	4842671	Y	4	0	0	N	T	06/28/15	N/A
Ram	1	1	398814	4823052	N	4	0	0	N	A	06/04/15	N/A
Ram	**2**	**2**	**399416**	**4822937**	**Y**	**4**	**4**	**2**	**?**	**H**	**07/15/15**	**08/10/15**
Reid Half Mile	1	1	440606	4846800	N	4	0	0	N	P	06/12/15	N/A
Reid Mile	1	1	441421	4847573	N	4	0	0	N	P	06/02/15	N/A
Reid Mile	1	1A	441356	4847503	Y	4	0	0	Y	T	06/28/15	N/A
Scarborough	1	1	394525	4822321	Y	4	4	3	N	H	06/24/15	07/19/15
Seawall	1	1	432860	4841374	Y	4	4	0	N	H	06/16/15	n/a
Seawall	2	2	434046	4841992	Y	4	4	3	N	H	06/21/15	07/16/15
Seawall	3	3	434905	4842437	Y	4	3	0	N	H	06/19/15	N/A
Seawall	**4**	**4**	**433239**	**4841537**	**N**	**4**	**4**	**3**	**N**	**H**	**06/29/15**	**07/24/15**
Seawall	5	5	434832	4842359	Y	4	4	2	N	H	06/18/15	07/13/15
Seawall	6	6	433368	4841614	N	4	4	3	N	H	07/06/15	07/28/15
Seawall	1A/7?	1/7?	432860	4841374	Y	4	3	3	?	H	07/24/15	08/18/15
Wells	1	1	373287	4796616	Y		0	0	N	A	06/03/15	N/A
Wells	2	2	373535	4797111	N	4	4	3	N	H	06/06/15	07/02/15
Wells	3	3	373395	4796829	Y	4	4	4	N	H	06/12/15	07/07/15
Wells	4	4	373229	4796502	N	4	0	0	N	P	06/03/15	N/A
Wells	5	5	373638	4797263	N	4	0	0	N	P	05/27/15	N/A
Wells	5	5A	373614	4797155	N	4	4	1	Y	H	07/16/15	08/05/15
Western	1	1	393349	4821397	N	4	0	0	N	P	06/08/15	N/A
Western	2	2	393152	4821585	Y	4	4	3	N	H	07/04/15	07/29/15
Western	1	1A	393278	4821446	Y	4	4	3	Y	H	07/12/15	08/07/15



2015 Piping Plover Nest Locations

Ogunquit Beach



Nest Location & Outcome

- Hatched
- Predation
- Foraging Area
- Essential Habitat

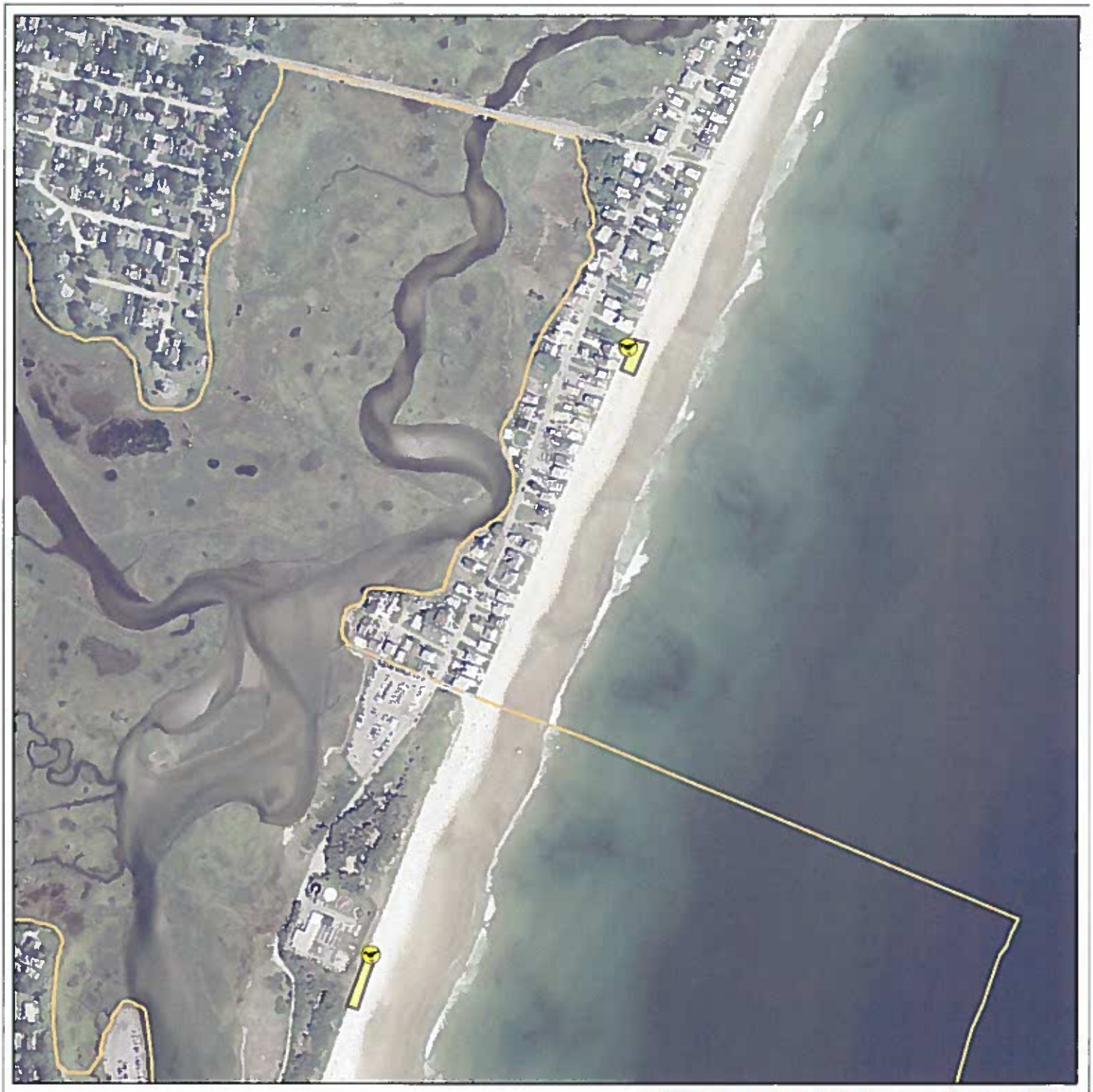
0 40 80 160 240 320 Meters

N W E S

Universal Transverse Mercator (UTM) Projection
North American Datum (NAD) 1983
Data Sources: MEGIS, MEIFW, Maine Audubon

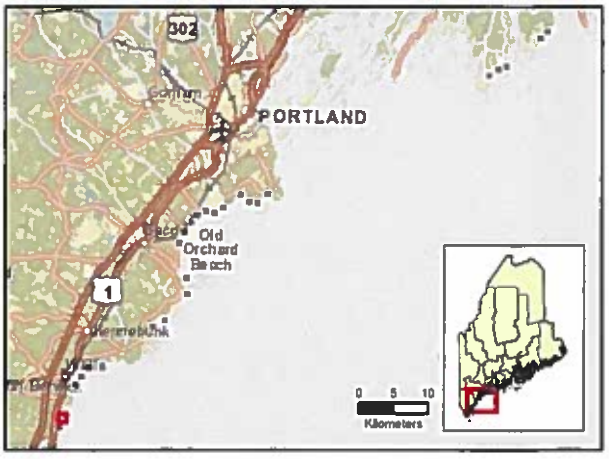
Map Prepared by Maine Department of Inland Fisheries & Wildlife

January, 28, 2016



2015 Piping Plover Nest Locations

Ogunquit Beach / Moody Beach



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Nest Location & Outcome

Hatched

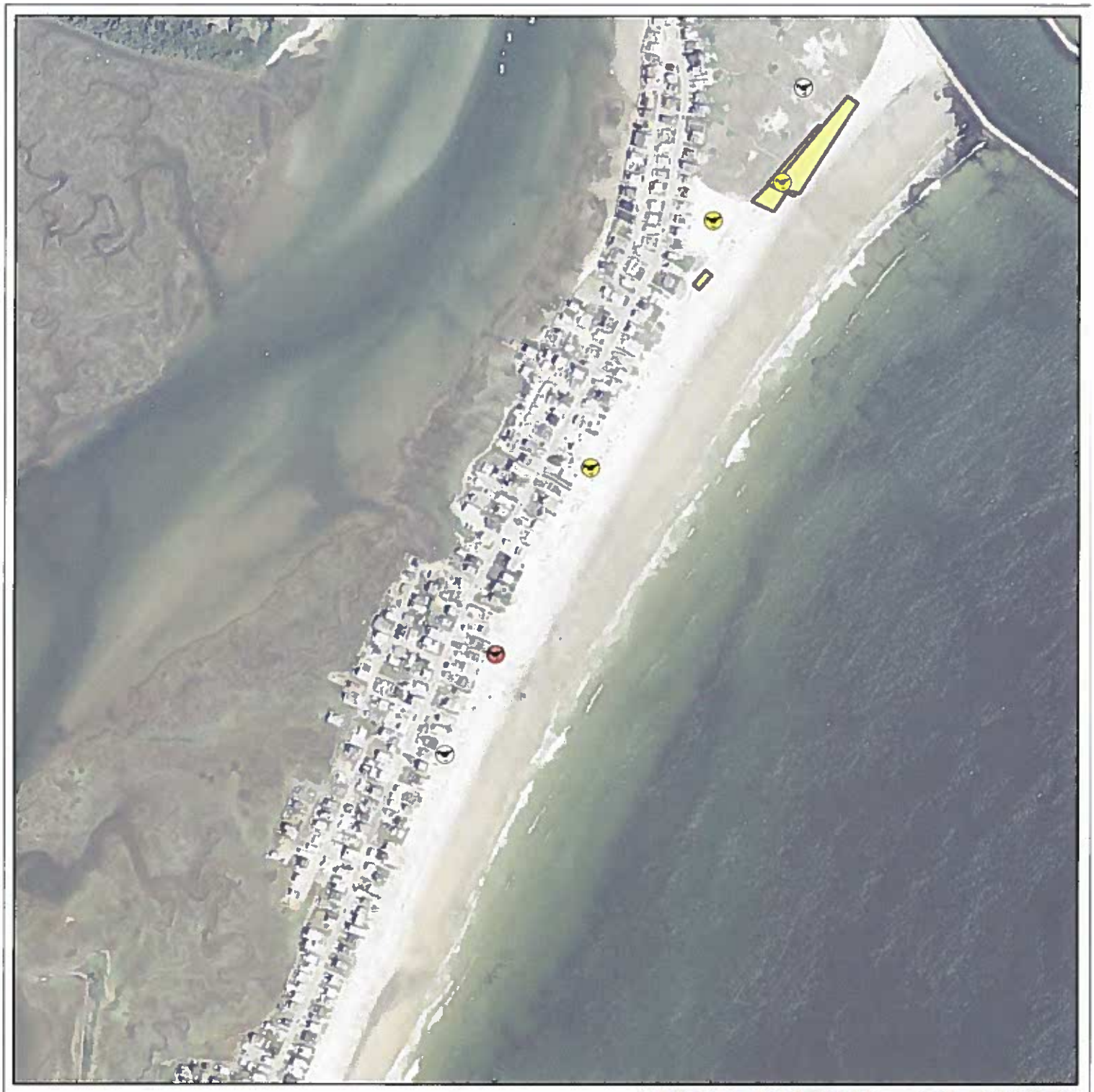
Foraging Area

Essential Habitat

0 40 80 160 240 320 Meters

N W E S

Universal Transverse Mercator (UTM) Projection
North American Datum (NAD) 1983
Data Sources: MEGIS, MEIFW, Maine Audubon



2015 Piping Plover Nest Locations
Wells Beach

Nest Location & Outcome

- Abandoned
- Hatched
- Predation
- Foraging Area

0 40 80 160 240 320 Meters

N W E S

Universal Transverse Mercator (UTM) Projection
North American Datum (NAD) 1983
Data Sources: MEGIS, MEIFW, Maine Audubon

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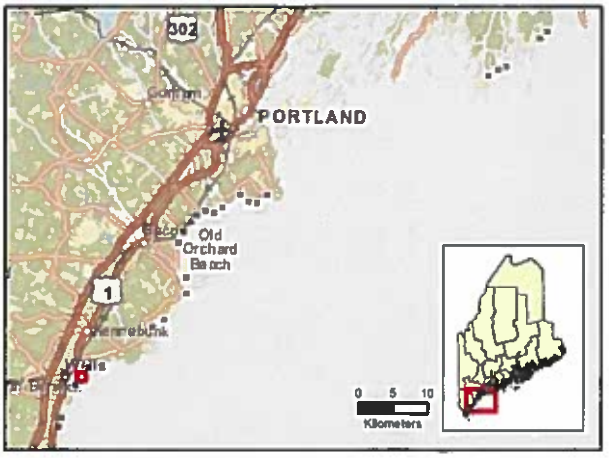
2015 Piping Plover Nest Locations

Drakes Island Beach



Nest Location & Outcome

Hatched

Foraging Area

Essential Habitat

Meters

0 40 80 160 240 320

N

W E

S

Universal Transverse Mercator (UTM) Projection
North American Datum (NAD) 1983
Data Sources: MEGIS, MEIFW, Maine Audubon

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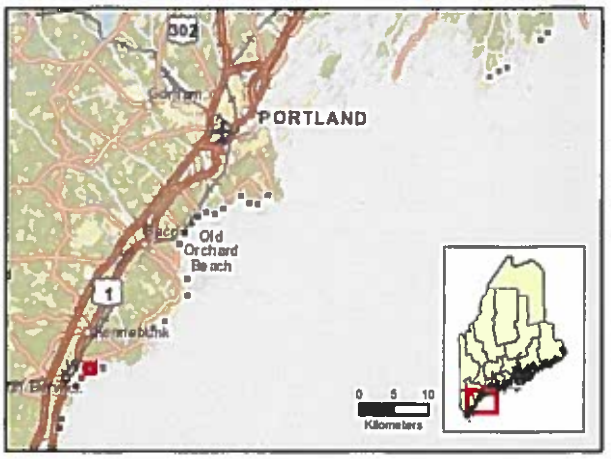
2015 Piping Plover Nest Locations

Laudholm Farm / Crescent Surf



Nest Location & Outcome

Hatched

Foraging Area

Essential Habitat

Meters

0 40 80 160 240 320

N W E S

Universal Transverse Mercator (UTM) Projection
North American Datum (NAD) 1983
Data Sources: MEGIS, MEIFW, Maine Audubon

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2015 Piping Plover Nest Locations

Goose Rocks

Map Prepared by Maine Department of Inland Fisheries & Wildlife

January, 28, 2016

Nest Location & Outcome

Hatched

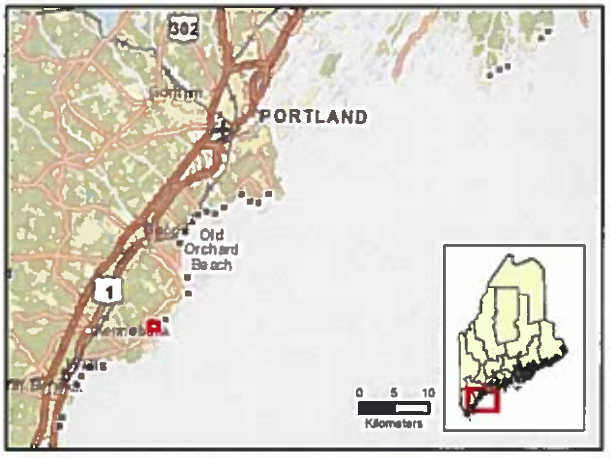
Foraging Area

Essential Habitat

0 40 80 160 240 320 Meters

N W E S

Universal Transverse Mercator (UTM) Projection
North American Datum (NAD) 1983
Data Sources: MEGIS, MEIFW, Maine Audubon



2015 Piping Plover Nest Locations

Goose Rocks (East)

Map Prepared by Maine Department of Inland Fisheries & Wildlife

January, 28, 2016

Nest Location & Outcome

Hatched

Foraging Area

Essential Habitat

0 40 80 160 240 320 Meters

N W E S

Universal Transverse Mercator (UTM) Projection
North American Datum (NAD) 1983
Data Sources: MEGIS, MEIFW, Maine Audubon

2015 Piping Plover Nest Locations

Fortunes Rocks

Nest Location & Outcome

Hatched

Foraging Area

Essential Habitat

0 40 80 160 240 320 Meters

N W E S

Universal Transverse Mercator (UTM) Projection
North American Datum (NAD) 1983
Data Sources: MEGIS, MEIFW, Maine Audubon

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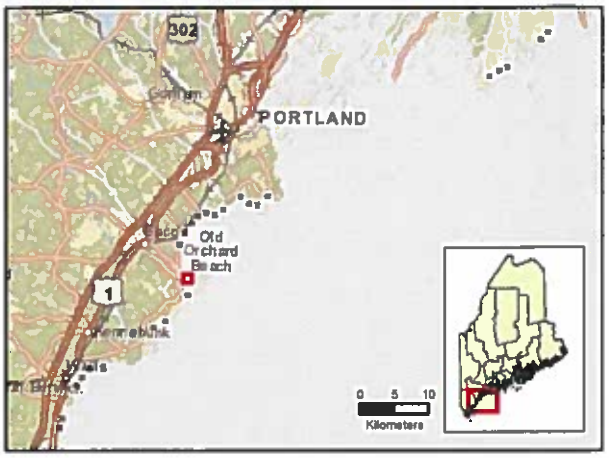
2015 Piping Plover Nest Locations

Hills Beach



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January, 28, 2016

Nest Location & Outcome

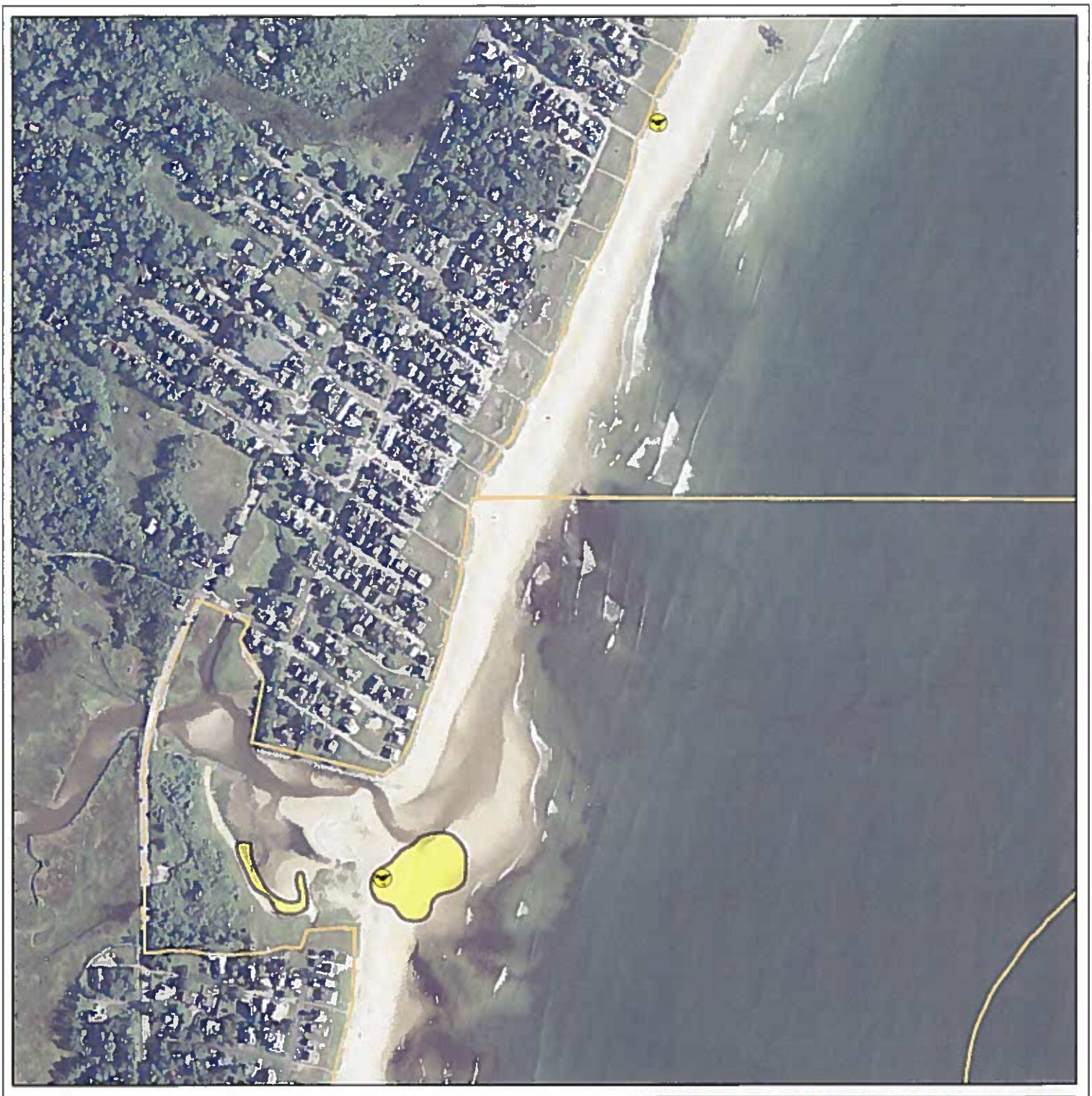
Abandoned

Foraging Area

0 40 80 160 240 320 Meters

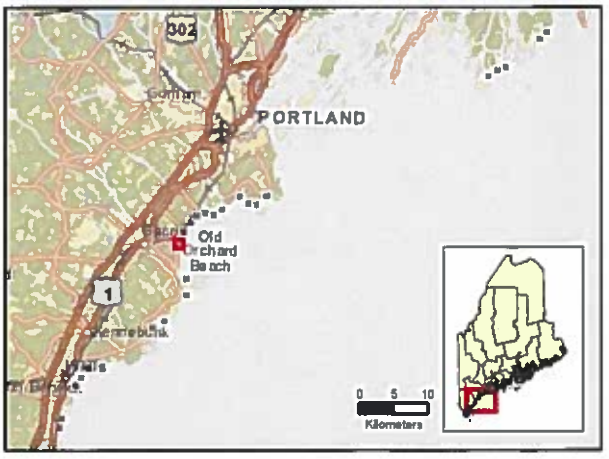
N W E S

Universal Transverse Mercator (UTM) Projection
North American Datum (NAD) 1983
Data Sources: MEGIS, MEIFW, Maine Audubon



2015 Piping Plover Nest Locations

Goosefare Brook / Ocean Park



Nest Location & Outcome

Hatched

Foraging Area

Essential Habitat

Meters

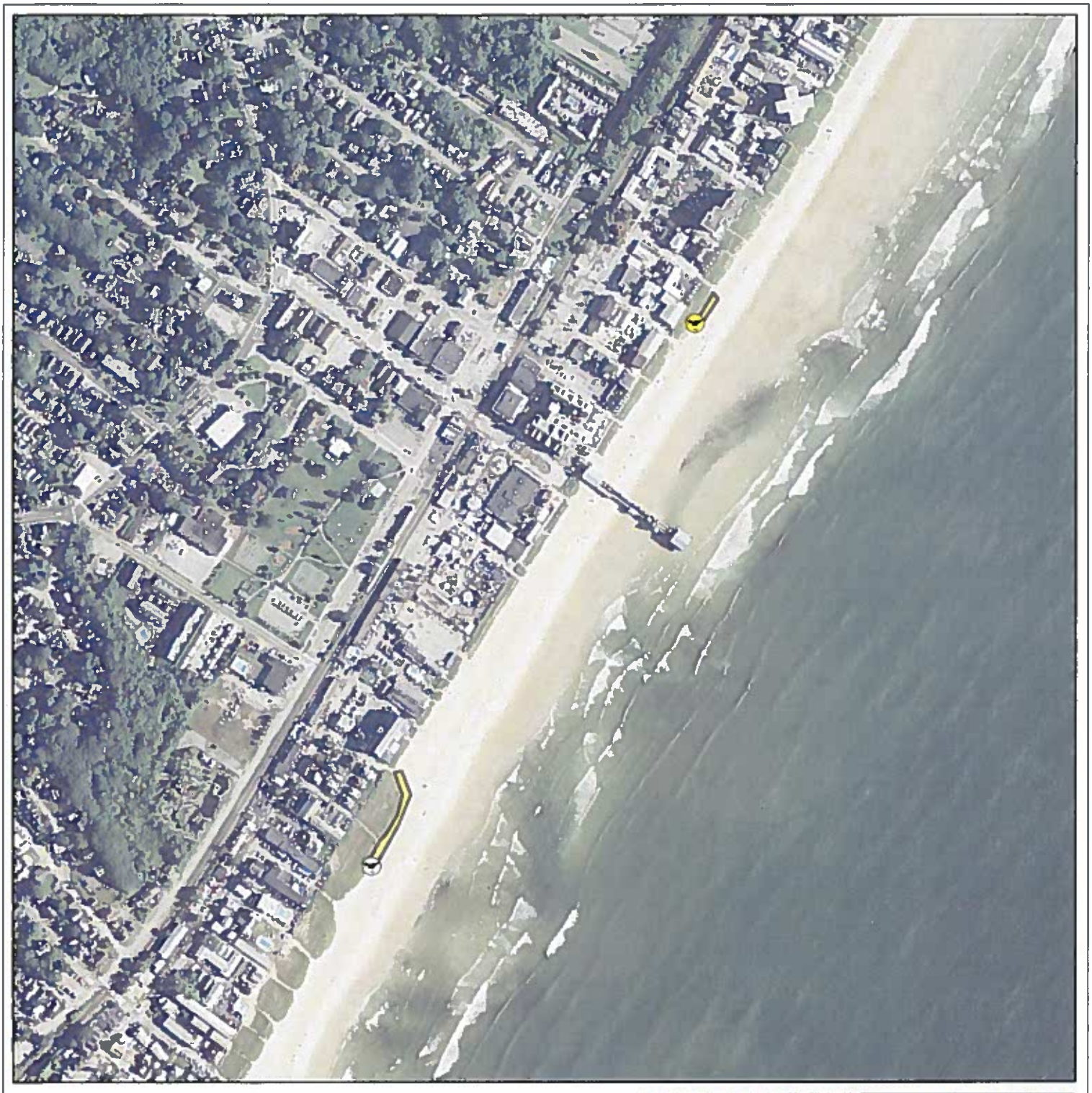
0 40 80 160 240 320

N W E S

Universal Transverse Mercator (UTM) Projection
North American Datum (NAD) 1983
Data Sources: MEGIS, MEIFW, Maine Audubon

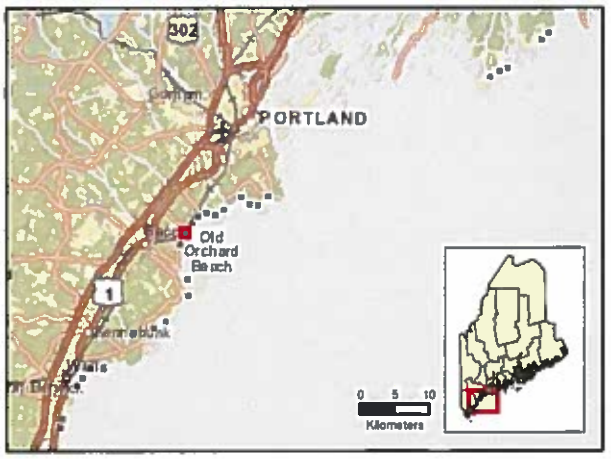
Map Prepared by Maine Department of Inland Fisheries & Wildlife

January, 28, 2016



2015 Piping Plover Nest Locations

Old Orchard Beach



Nest Location & Outcome

Hatched

Foraging Area

Predation

Meters

0 40 80 160 240 320

N

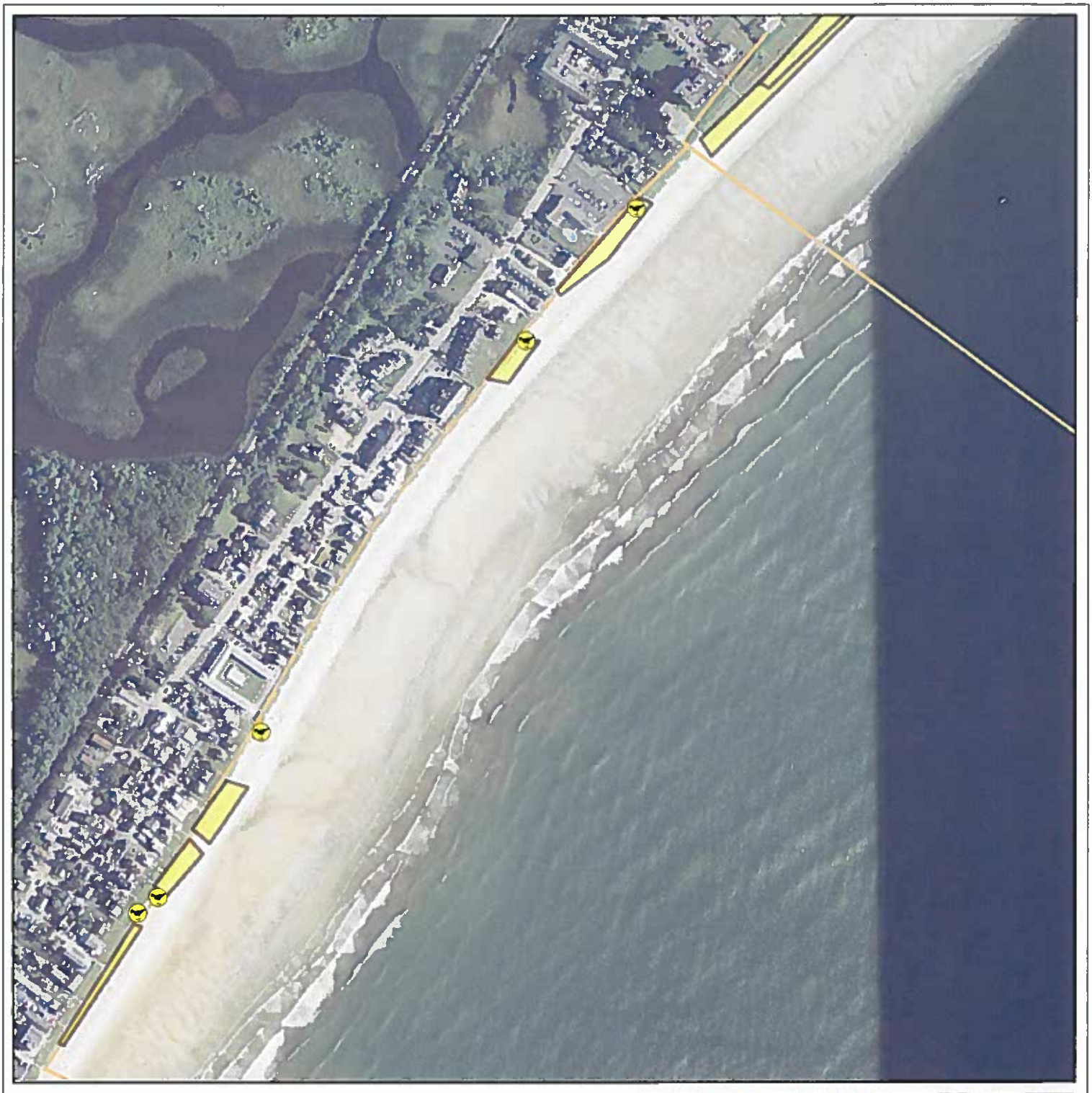
W E

S

Universal Transverse Mercator (UTM) Projection
North American Datum (NAD) 1983
Data Sources: MEGIS, MEIFW, Maine Audubon

Map Prepared by Maine Department of Inland Fisheries & Wildlife

January, 28, 2016



2015 Piping Plover Nest Locations

Old Orchard Beach - Surfside / Grand Beach

Map Prepared by Maine Department of Inland Fisheries & Wildlife

January, 28, 2016

Nest Location & Outcome

Hatched

Foraging Area

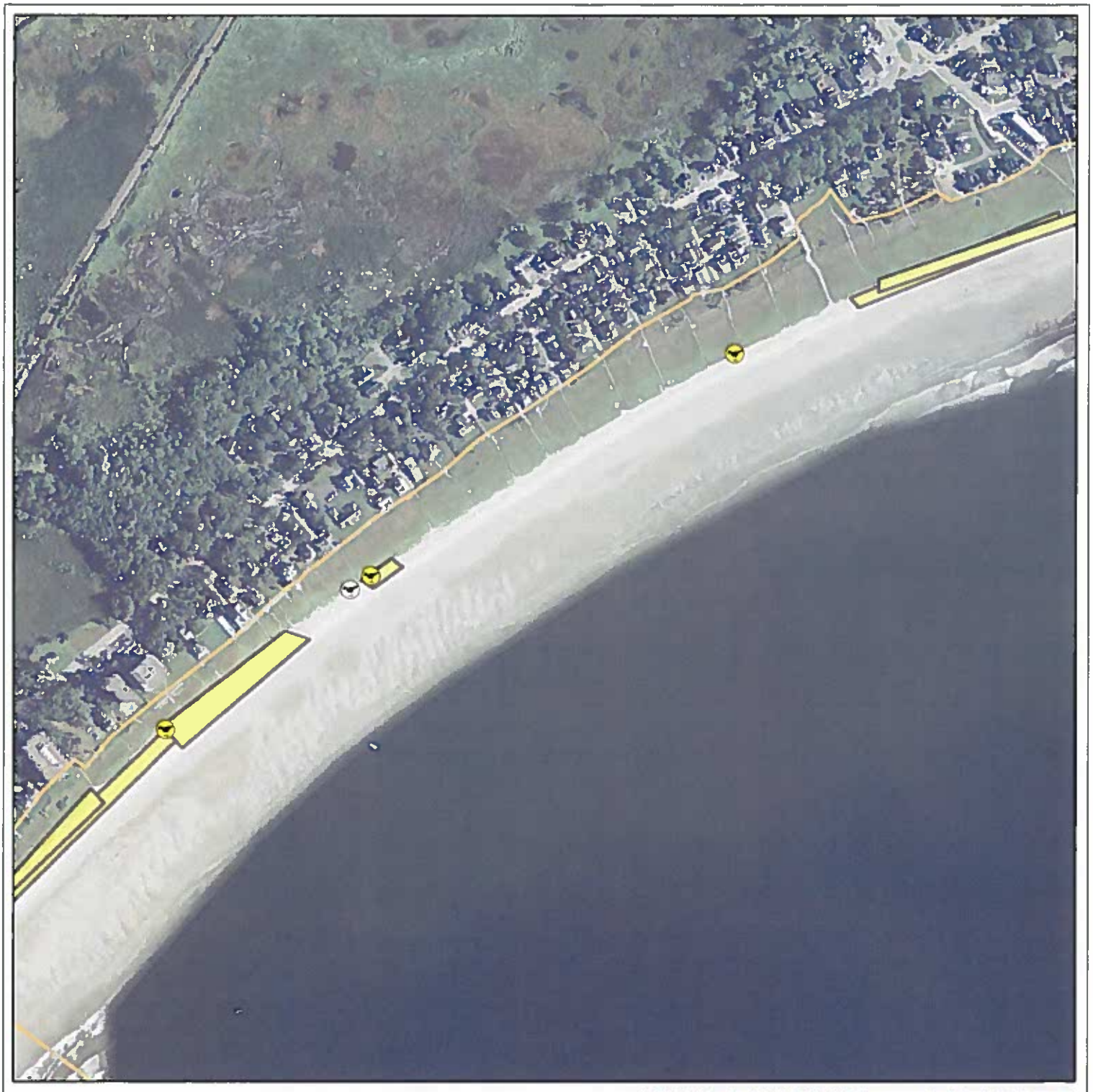
Essential Habitat

Meters

0 40 80 160 240 320

N W E S

Universal Transverse Mercator (UTM) Projection
North American Datum (NAD) 1983
Data Sources: MEGIS, MEIFW, Maine Audubon



2015 Piping Plover Nest Locations

Old Orchard Beach - Grand Beach / Pine Point

Map Prepared by Maine Department of Inland Fisheries & Wildlife

January, 28, 2016

Nest Location & Outcome

- Hatched
- Predation
- Foraging Area
- Essential Habitat

0 40 80 160 240 320 Meters

N W E S

Universal Transverse Mercator (UTM) Projection
North American Datum (NAD) 1983
Data Sources: MEGIS, MEIFW, Maine Audubon

2015 Piping Plover Nest Locations

Pine Point

Map Prepared by Maine Department of Inland Fisheries & Wildlife

January, 28, 2016

Nest Location & Outcome

Predation

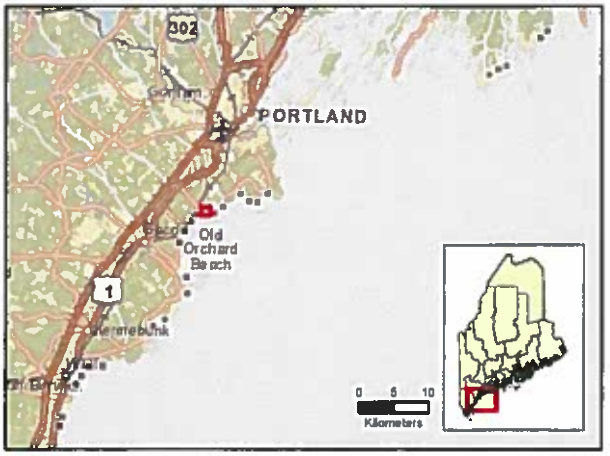
Foraging Area

Essential Habitat

0 40 80 160 240 320 Meters

N W E S

Universal Transverse Mercator (UTM) Projection
North American Datum (NAD) 1983
Data Sources: MEGIS, MEIFW, Maine Audubon



2015 Piping Plover Nest Locations

Western Beach

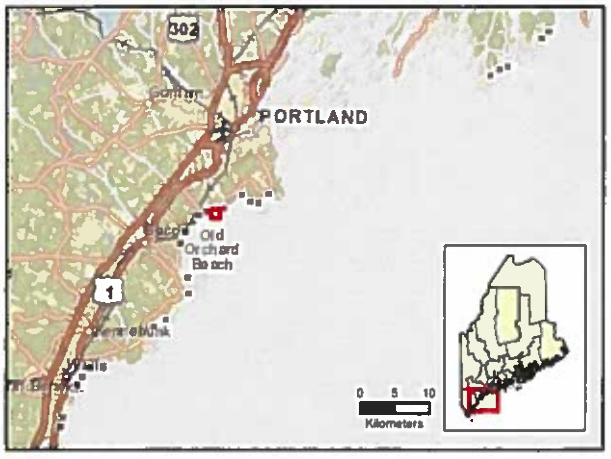
Nest Location & Outcome

- Hatched
- Predation
- Foraging Area
- Essential Habitat

0 40 80 160 240 320 Meters

N W E S

Universal Transverse Mercator (UTM) Projection
North American Datum (NAD) 1983
Data Sources: MEGIS, MEIFW, Maine Audubon

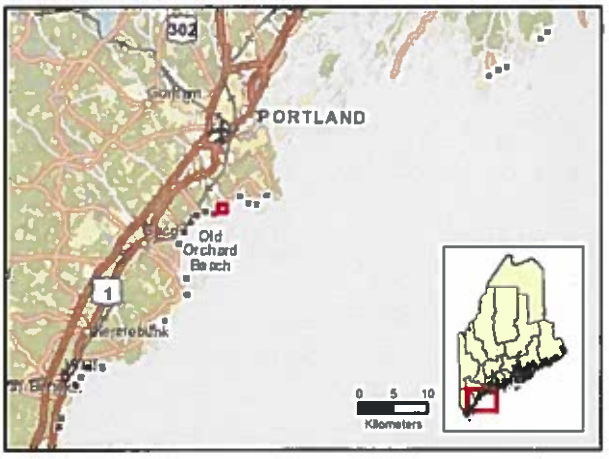


Map Prepared by Maine Department of Inland Fisheries & Wildlife

January, 28, 2016

2015 Piping Plover Nest Locations

Scarborough Beach



Map Prepared by Maine Department of Inland Fisheries & Wildlife

January, 28, 2016

Nest Location & Outcome

Hatched

Foraging Area

Essential Habitat

0 40 80 160 240 320 Meters

N W E S

Universal Transverse Mercator (UTM) Projection
North American Datum (NAD) 1983
Data Sources: MEGIS, MEIFW, Maine Audubon

2015 Piping Plover Nest Locations

Higgins Beach

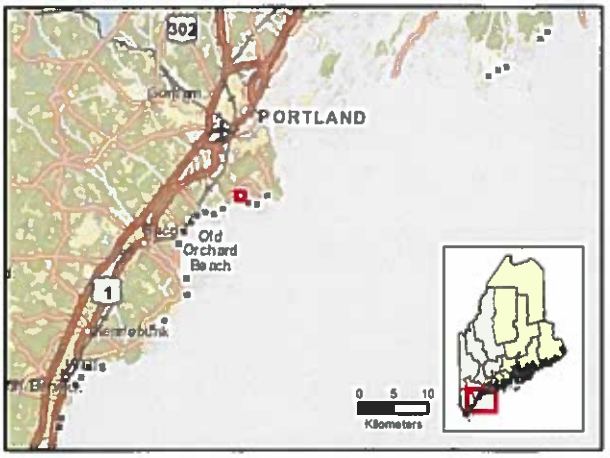
Nest Location & Outcome

- Abandoned
- Hatched
- Predation
- Foraging Area
- Essential Habitat

0 40 80 160 240 320 Meters

N W E S

Universal Transverse Mercator (UTM) Projection
North American Datum (NAD) 1983
Data Sources: MEGIS, MEIFW, Maine Audubon



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January, 28, 2016

2015 Piping Plover Nest Locations

Ram Island - Nano's Beach

Nest Location & Outcome

- Abandoned
- Foraging Area
- Essential Habitat

Meters

0 40 80 160 240 320

N W E S

Universal Transverse Mercator (UTM) Projection
North American Datum (NAD) 1983
Data Sources: MEGIS, MEIFW, Maine Audubon

Map Prepared by Maine Department of Inland Fisheries & Wildlife

January, 28, 2016

2015 Piping Plover Nest Locations

Ram Island - Breakwater

Map Prepared by Maine Department of Inland Fisheries & Wildlife

January, 28, 2016

Nest Location & Outcome

- Hatched
- Foraging Area
- Essential Habitat

0 40 80 160 240 320 Meters

N W E S

Universal Transverse Mercator (UTM) Projection
North American Datum (NAD) 1983
Data Sources: MEGIS, MEIFW, Maine Audubon

2015 Piping Plover Nest Locations

Crescent Beach State Park

Map Prepared by Maine Department of Inland Fisheries & Wildlife

January, 28, 2016

Nest Location & Outcome

- Hatched
- Predation
- Foraging Area
- Essential Habitat

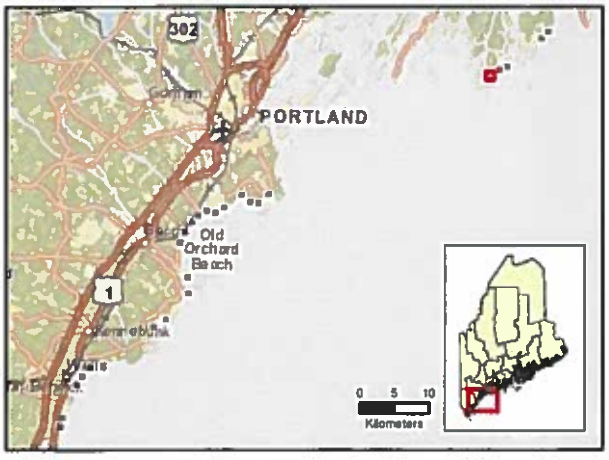
0 40 80 160 240 320 Meters

N W E S

Universal Transverse Mercator (UTM) Projection
North American Datum (NAD) 1983
Data Sources: MEGIS, MEIFW, Maine Audubon

2015 Piping Plover Nest Locations

Seawall Beach



Nest Location & Outcome

Hatched

Foraging Area

Essential Habitat

0 40 80 160 240 320 Meters

N W E S

Universal Transverse Mercator (UTM) Projection
North American Datum (NAD) 1983
Data Sources: MEGIS, MEIFW, Maine Audubon

Map Prepared by Maine Department of Inland Fisheries & Wildlife

January, 28, 2016

2015 Piping Plover Nest Locations

Seawall Beach (East)

Map Prepared by Maine Department of Inland Fisheries & Wildlife

January, 28, 2016

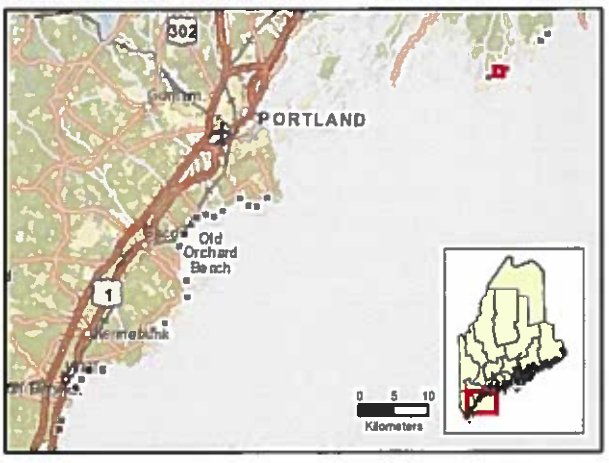
Nest Location & Outcome

- Hatched
- Foraging Area
- Essential Habitat

0 40 80 160 240 320 Meters

N W E S

Universal Transverse Mercator (UTM) Projection
North American Datum (NAD) 1983
Data Sources: MEGIS, MEIFW, Maine Audubon



2015 Piping Plover Nest Locations

Popham Beach

Map Prepared by Maine Department of Inland Fisheries & Wildlife

January, 28, 2016

Nest Location & Outcome

Hatched

Foraging Area

Essential Habitat

Meters

0 40 80 160 240 320

N W E S

Universal Transverse Mercator (UTM) Projection
North American Datum (NAD) 1983
Data Sources: MEGIS, MEIFW, Maine Audubon

2015 Piping Plover Nest Locations

Reid State Park - Half Mile Beach

Map Prepared by Maine Department of Inland Fisheries & Wildlife

January, 28, 2016

Nest Location & Outcome

Predation

Foraging Area

Essential Habitat

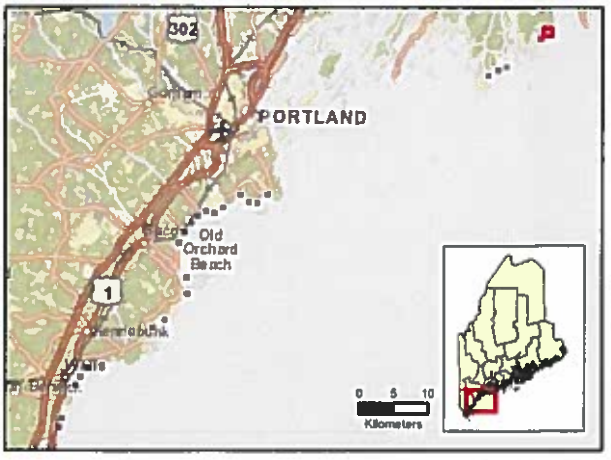
0 40 80 160 240 320 Meters

N W E S

Universal Transverse Mercator (UTM) Projection
North American Datum (NAD) 1983
Data Sources: MEGIS, MEIFW, Maine Audubon

2015 Piping Plover Nest Locations

Reid State Park - Mile Beach



Map Prepared by Maine Department of Inland Fisheries & Wildlife

January, 28, 2016

Nest Location & Outcome

Predation

Foraging Area

Essential Habitat

0 40 80 160 240 320 Meters

N W E S

Universal Transverse Mercator (UTM) Projection
North American Datum (NAD) 1983
Data Sources: MEGIS, MEIFW, Maine Audubon